THE FINISHING TOUCH



THERE are still some jobs in Mathieson's plants which science just can't reduce to routine. Finishing solid caustic soda, for example, is one which calls for unusual skill on the part of the workman. Thus even at Lake Charles—"the most efficient alkali plant in the world"—it takes men like J. V. Campbell to furnish that "finishing touch" which has so much to do with the quality of Mathieson Solid Caustic.

Jim Campbell, carefully watching over his caustic pots, is one of the hundreds of capable, loyal men who give their best to Mathieson's "big little" jobs. Skillful, proud of their work, these men constitute one of the important reasons for the day-in and day-out dependability of Mathieson Chemicals and Mathieson Service.

The MATHIESON ALKALI WORKS (Inc.)

60 East 42nd Street **New York, N. Y.**

Soda Ash . . . Caustic Soda . . . Bicarbonate of Soda . . . Liquid Chlorine . . . Bleaching Powder . . . HTH and HTH-15 Ammonia, Anhydrous and Aqua . . . PH-Plus (Fused Alkali) . . . Sulphur Chloride . . . CCH (Industrial Hypochlorite) Dry Ice (Carbon Dioxide Ice) . . . Analytical Sodium Chlorite

The Reader Writes:—

"Them What Has Gets"

Wish you would poll the chemical people—all groups—in the fashion of the Roosevelt Survey in this month's *Fortune*. It would be most interesting to many of your readers to check a cross-section of ourselves against the average of the U. S. A.

You have more original ideas than most of the technical and trade papers (and I read many of them) so I feel as if I were sending the proverbial coals to Newcastle; but I am sure my suggestion would be good, and I trust it will be welcome.

Baltimore, Md. T. H. Redding

We Will Ask Him

What happened to stir "a young man named Bert White of the Liberty Bank of Buffalo" to some real idea of what kind of service a bank ought to render? Was it the depression? Or Franklin D. Roosevelt?

I would like to know, for it is a good sign, and I would like to have more of the same sort of pressure applied to the bankers if we could be sure of getting the same results.

Brockton, Mass. Matthew Dwyer

The Jewel of Consistency

You are not very consistent. Here you have been writing editorials in support of the independent consulting chemist and chemical engineer. Now you give wide publicity to a clever scheme of getting more work for company laboratories and the service departments of different manufacturers. Besides being inconsistent this seems to be unkind.

Berkeley, Calif. John W. Beers

Thanks for Dr. Geer

Great stuff, those articles "Creating Industries!" The best so far, in my opinion, is the review of progress in rubber compounding, but all of them are most interesting and useful.

Worcester, Mass. John N. Cuneo

And to Dr. Roark

The extremely able resumé of developments in the agricultural insecticidal field since the War by R. C. Roark in your June number is very valuable in that it points out clearly the importance of new materials of coal-tar origin. There are many in the industry who are either unaware of these developments or are ignoring them. They promise to lead to the first radical improvement in insect and fungus control that we have had in two generations. With the expanding use of pyrethrum, cube, and derris, the use of new synthetic organics, the armory of lethal weapons in the fight against insect destruction and damage of our food crops is strengthened and diversified.

The economic importance of this fight is now pretty widely appreciated, and the economic effects upon the chemical industries of the lesser importance of lead and copper arsenates and copper sulfate is rather notable.

Thank you for publishing this splendid article.

Seattle, Wash. Shelton H. Boardman

Trend Upward Since 1922

The general trend of development in the United States interests me greatly. If I compare your latest copy with what I remember of your paper in 1922 and 1923, when I received it in New York, I must say that every reader ought to be pleased with the changes and improvements which you have made since then.

Hamburg, Germany G. C. F. Techow

Chemist's Complaint

Two diametrically opposite attitudes on the part of the chief employers of chemists contribute directly to the uncertainties of regular employment for chemically trained men and add materially to the difficulties of their obtaining re-employment. Among the larger chemical manufacturers there is apparently a strong feeling against hiring a research or plant man previously employed by a competitor. In the consuming industries this feeling is reversed, and the first step in progress is seemingly to hire away the technical men of successful competitors.

From the ethical viewpoint the former practice has certainly so much to commend it that even a technical man who has found it impossible to find work in the fields where his experience should naturally command a premium salary hesitates to fight against a moral issue. The latter practice is so crude and usually so unsuccessful that even the man who has profited by this policy will not defend it.

I know from bitter experience that these opposite practices are a double-edged sword that hangs over every chemist's head. Maybe there is no answer to this condition. I admit I can think of none. Nevertheless it is the basis of the only sound argument I have ever heard advanced for the unionization of technical workers.

Detroit, Mich. W. B. Webster

Wants to Nail Mis-facts

H. Mann Gardiner is perfectly correct when he advocates that every chemical "mis-fact" ought to be immediately corrected publicly. It does not make any difference whether the misstatement is made by some shabby stock promoter or the President of the United States, the true facts should be made clear. If not, everyone in chemistry is more or less, directly or indirectly injured. Because it is everybody's business, probably nothing will be done about it.

Cincinnati, O. H. T. Libby

Ignorant and Innocent

What do you really know about the wonderful chemical progress made by the Soviet Republics? Frankly, I do not think you know very much, and what's more, you do not seem to want to take the trouble to ascertain the real facts. You seem perfectly willing to swallow any anti-Russian chemical story published in the capitalist press in any country, but I see no sign of the typical American spirit of fair play in presenting to your readers any record of the well substantiated progress in many chemical lines of production in Russia.

New York City Emmanuel Keane

CHEMICAL INDUSTRIES

The Chemical Business Magazine

Consulting Editorial Board
R. T. Baldwin, L. W. Bass, F. M. Becket, B. T. Brooks, J. V. N. Dorr, C. R. Downs, W. M. Grosvenor, W. S. Landis, and M. C. Whitaker.

ADVERTISING PAGES REMOVED

Three Mid-year Records

JULY first the Government of the United States made a number of new records. It closed its books for the eighth consecutive fiscal year with red figures, the longest period of continuous deficit in its history. Last year's deficit was achieved in spite of the second largest revenues ever received. The coming fiscal year promises to end July 1939 with a record all-high deficit. Let us, as a former Governor of New York likes to suggest, examine these records.

Eight years continuous borrowing to pay expenses have fostered an easy, dangerous habit which it will be difficult to break. That habit, unless broken, will ruin the richest, most powerful government just as surely as it will the weakest, most improvident individual.

The eighth year's deficit was the smallest in Mr. Roosevelt's administration. This is made much of, but it, in fact, contradicts the President's oft repeated argument that with business recovery and its attendant higher taxes receipts, the deficit will be wiped out. Revenues received during the last fiscal year were exceeded in only one year in the country's history, yet the budget failed to balance by over one billion dollars. In the face of these facts, the argument falls limp, and the prospects seem dark.

The new high record deficit forecast for this coming fiscal year is chiefly due to the renewal of pump-priming. In the "war against the depression," we have spent more than it cost to fight England twice, Spain and Mexico once, and to save the Union and make the world safe for democracy. And there are more than 20,000,000 Americans on relief.

The very day these three great records were made, President Roosevelt told the teachers of America that it makes far less difference what the nation's balance sheet shows in dollars than what it reveals in the assets of natural resources and human values. Splendid! But silly from the man who worked day and night last winter to pass legislation to restrict crops and renew pump-priming.

Williams Haynes, Publisher and Editor; A. M. Corbet, and W. J. Murphy, Associate Editors; W. F. George, Advertising Manager; D. O. Haynes, Subscription Manager; J. H. Burt, Production Manager.

Investments in Inventory An importer with an international chemical experience that goes back to before the War notes that never in his career has he found such wide variations in the different chemical markets as are nowadays quoted by cable. On thoroughly standard items differences of ten, fifteen, even twenty-five per cent. between London, Berlin, Paris, and Antwerp are the rule, not the exception. No one market is consistently low—or high—and apparently it is either a question of whose stocks are mounting or whose foreign credits need bolstering.

Such a market situation offers a smart trader rare opportunities to make money offering bargains. "But," he bewails, "nobody will buy nothing. Even big New England consumers will not pick up necessary chemicals at substantial discounts."

This comment reveals unwittingly the psychology of the present business situation. New England manufacturers understand perfectly that "well bought is half sold" and they have long been famous for shrewdly anticipating their raw materials requirements. Today they have at once the cash—or the credit—and the opportunity to make such investments in inventory; but—

What of the Fall? Although the stocks of all sorts of chemical supplies in the hands of industrial consumers are admittedly depleted in all sections and in every industry, nevertheless a cross-section check-up made since June 20, when the New York stock market swung so sharply upwards, has failed to uncover any substantial increase in chemical deliveries. Hand-to-mouth buying is the rule in practically every purchasing department; and both producers and distributors describe the past June in terms usually applied to the dead of mid-summer. Demand is dormant, but beginning to stir.

Out in the plants no responsive spark has been struck by the news from Wall Street. In most manufacturing circles the encouraging conclusion that the advance in stocks foretells a general business revival in the early Fall is more than offset by the opinion that the booming securities market is but a flash in the pan. This cautious attitude doubtless arises from the lack of any tangible cause for the sudden rise in stock values or any plausible reason to expect the sustained continuance of these enhanced equities. Twice burned, the average business man is manfully refusing "to discount the stock market." In his determination to indulge in no wishful thinking, it is not unlikely that he is being led into an equally erroneous pessimism.

For nobody can gainsay the psychological effects of the stock market, especially so when the advance has been so sharp and so broad: from eight to nine hundred issues of over two million shares daily during the last fortnight in June. Every higher sale is evidence that someone, somewhere, believes that a still higher sale will be made sometime. Brisker retail trade and a moderate upturn in the more sensitive commodity prices are the first observable effects, and with depleted manufacturing inventories these will not be long in affecting chemical business. Here is the tangible basis for the expectation of a busy autumn.

Metals as Indicators Painstaking work with chemical, commodity and financial figures for our Statistical Section inclines us to agree with those few business analysts who insist that the metal market, rather than the stock market, is the true barometer of business. Tin, lead, and zinc advanced sharply early last month and well in advance of the upturn in stocks. Yet but thirty days ago the statistical position of each of the metals was being described as "poor." In several advances lead has reached $4.75, a 75 point rise, and it is now back where it stood the first of the year. Zinc is up 35 points in the same period. Tin has advanced more than seven cents, while copper on the last day of the month managed a quarter of a cent rise. Of more immediate importance to the chemical field is a reminder that the prices of many chemicals depend upon the metal markets. These are the items likely to lead the price recovery.

The Public Be Courted A telling argument for better public relationships and a neat example of one way that they may be encouraged are both to be found in the following pages. Just opposite is Mr. Rand's excellent exhortation. In the picture section are a page of photographs of Calco's exhibit at their "open house party" which apparently everybody in Bound Brook agrees was a great stroke of neighborly diplomacy.

Four Business Partners

Chemical industry, a pioneer in research and in expert technical service to its customers, is awakening rapidly to the need for better public relations, a more friendly feeling with its plant community, a franker attitude towards its shareholders, and a determined effort to dispel the mysteries of alchemy which in the minds of many people still surrounds chemical manufacturing. As president of



the Associated Manufacturers of Massachusetts, William M. Rand, Monsanto's vice-president in charge of the Merrimac Division, writes monthly a message to its membership; and in this, which is printed below, he sets forth very plainly the causes of general industry's unpopularity and the effects which might come from a better mutual understanding with the four partners who have come into our modern industrial set-up.

OUR great corporations have had relatively small beginnings. The origin of many of them is traceable to the initiative, foresight, labor and sacrifice of some individual. Their size and financial power came gradually. These corporations have played an important part in the building of the nation. They stand as monuments to their founders, all rugged individualists, self-reliant pioneers with vision, ambition and courage. The only partner of each of them was Capital, in the form of stockholders who depended for their earnings on his business ability alone.

Time and events have brought changes. Whether the corporation likes it or not there are four partners who operate it now: Capital, Labor, the Public and Government. They are not congenial partners. Each sees glaring faults in the others. Each feels that its contribution to the welfare of the company is vital and therefore that its share of the profits should be greater.

Capital invests the funds that make possible the undertaking (the average for a manufacturing plant in terms of labor is approximately $10,000 for each workman in the plant). In order that it may watch its investment Capital demands control of the management. It expects of Government that it be given freedom within the law to operate without persecution or confiscatory taxation, that it be given the opportunity to do what it deems best for all concerned with its profits. Capital demands of Labor that it live up to its agreements and that it clothe itself in responsibility by incorporation. Labor, the Public and Government, remembering some of the ills of the past, are skeptical of the sincerity of Capital's attitude.

Labor contributes the working force. It demands fair wages, shorter hours, safe, healthful working conditions, and as it is human lives with which it deals it demands security and an assurance of continued work. Capital is attempting to work out its difficulties with Labor, but hesitates when it considers the methods Labor uses to obtain its ends—methods far worse than the worst that Capital long ago discarded. It fears Government arbitration, for Government, made up of politicians, favors Labor with its huge voting power.

The Public contributes the market, the investors, and elects the Government. It is the most important partner of all and its requests are modest. It requires honesty in operating and in advertising, freedom from disturbance and annoyance in labor disputes, lower costs and cheaper products. It is the partner wooed by all others. Its good will is eagerly sought.

The other partner, Government, unwelcome to all, forced itself into the partnership. It contributes little. It demands that it control Capital and Labor, and the right to confiscate for itself a large share of the earnings. It claims to be the champion of Labor, yet treats its own employees shabbily. It lays down laws for Capital, yet is unable to operate any of its own departments with economy or financial success. It does not protect Labor which it champions from the invasion of foreign products manufactured under wages and working conditions abhorrent to American standards. It demands maintenance of agreements, yet repudiates its own contracts. Its entrance as a partner injures business. It has no valid reason for interference. Its functions were never intended to intrude in the business affairs of its citizens unless it were called upon to protect the public because of failure or dishonesty.

Capital has been indirectly responsible for this governmental intrusion. Management has not given sufficient thought to public relations. If corporations in the past ten years had frankly told the public of their problems, their failures and their successes; if they had been sincere about their labor policies, open instead of secretive, they would have had the good will of the Public, and Government would have been unable to invade business. A word from the Public, forcefully spoken, and Government obeys!

Cellulose

as a Chemical Raw Material

By Gustavus J. Esselen and Walter M. Scott

CELLULOSE is essential to the newest civilization as it was to the most primitive. Bountifully supplied by Nature, cellulose as the structural material of plants was the first convenience of primitive man. Subtly altered by modern chemical processes, cellulose provides the most modern of luxuries.

Even the barest outline of primitive man's uses for cellulose becomes a treatise in itself, for at no point in his life was he without it. Fuel, arms, housing and clothing, his earliest needs, were met by utilizing the trees, shrubs and plants which abundantly adorned his world. When his immediate needs were met and with his wooden bow, arrows and war club he set forth to explore and conquer more territory, cellulose supplied his boats, his oars, his sails. Indeed, no part of his crude life failed to utilize in some way the material we now know as cellulose.

The very plenitude of cellulose forced it into the position of life's prime essential. Nor is its abundance limited. Wherever one may search, short of the polar regions, plants provide a continuously renewed supply of this essential. Unlike sparsely distributed minerals, for which man must dig deep into the bowels of the earth, cellulose grows in profusion on top of the ground. Unlike Nature's other provisions, the store of cellulose is replenished with each succession of seasons in such bounty that there is no conceivable shortage of it beyond a possible dearth limited in both time and place. Even the huge demands of multiplying modern applications have succeeded only partially in creating local stringencies which time overcomes. If one source fails, a myriad of others are ready to take its place.

Obviously, then, advancing science and industry had in cellulose a raw material ready made to their purposes. Nothing is more plentiful, except air and water, and nothing by its innate complexity possesses such enticing possibilities in the hands of modern chemical processors. The initial fibrous structure of cellulose makes it valuable in textiles and in paper. From several points of view this structure is short of the ideal. In modern utilization of cellulose the first step is to destroy this structure and impose a new and more useful one on the material. Thus rayon, Cellophane, protective coatings and molded articles, to mention but a few, owe their origin to the chemists' ability to destroy and rebuild the structure of cellulose.

The gross structure of cellulose fibers is, of course, familiar. Its molecular and ultra-microscopic makeup are as yet only partially understood. Its molecule consists of many units probably resembling the universally present glucose molecule, but just how these units are assembled and even the number of them in each molecule—the molecular weight of cellulose is probably of the order of 30,000, but even that is not sure—are still matters of uncertainty.

These wide gaps in our knowledge of cellulose have not prevented its fecund application through chemical processing. Technology has leaped over the unknown and, as often happens, has produced economically important results long before science can fully explain them.

At the beginning of the present century the chief user of cellulose as a chemical raw material was the nitrocellulose industry. At that time the cellulose was in the form of white tissue paper made from cotton and linen rags. Limited quantities of absorbent bleached cotton roving were also employed, but considerations of cost kept this form at a minimum. The demand for nitrocellulose explosives during the war so stimulated the production of bleached cotton linters, that the potential surplus naturally found its way into those chemical industries dependent upon cellulose as raw material. In the pyroxylin plastics (Celluloid) industry for example, it began to be used to replace rag tissue about 1920.

The use of wood pulp, on the other hand, as a chemical raw material, had always been limited to the viscose (regenerated cellulose) industry until about 1933, at which time progress in the purification of sulfite pulp had reached the point where it could be considered as a raw material for nitration. Considerable work has been done in recent years to make purified sulfite pulp available for acetylation, and several concerns have recently reported success in the commercial production of cellulose acetate from this raw material.

While scientists have sought the key to the riddle of cellulose, technologists have set up empirical but distinctly useful criteria for designating the varying properties of the material in such a way as to fit with the uses to which it is put. Lacking scientific precision, the terms α, β and γ (alpha, beta and gamma) cellulose are essentially descriptions of cellulose for practical purposes.

Alpha cellulose, the most important chemical type, is defined as that portion of the cellulose which resists the solvent action of 18% sodium hydroxide solution at 20° C. Beta cellulose dissolves in 18% sodium hydroxide and reprecipitates on the addition of acid. Gamma cellulose dissolves and remains in solution after acid is added. These terms are thus related to the behavior of cellulose under chemical treatment and roughly represent the degrees of difficulty with which materials from various sources and various purification processes undergo chemical changes. Alpha cellulose is the preferred type for chemical processing and the recovery of cellulose from plant raw materials must be so conducted as to preserve that part of the product.

In the structures of plants, cellulose occurs mixed more or less intimately with various cementing materials which give strength to the plant, and with other substances essential to the plant's metabolism. Cotton fibers are initially the purest raw cellulose, but because of their cost, other sources, more particularly wood, are also utilized quite extensively as raw materials.

Necessarily the value of any raw product as a source of cellulose is related to the selling price of the cellulose recovered from it less the cost of that recovery. Consequently, the choice of raw material depends upon three important characteristics, the expense incident to collecting the raw material, the cost of processing, and the grade and yield of the product. Competitive demands for the raw material for other uses, and the cost of its growth and collection at processing plants are factors as important in the final choice as the cost of processing itself and the yield and quality of the cellulose recovered. Neglect of these facts has often led astray persons interested in supplying part of our immense demand for cellulose. Two raw materials now supply the vast majority of our cellulose requirement: cotton and wood.

Cotton Linters

Cotton is the purest naturally occurring form of cellulose and requires only relatively simple chemical purification to yield a product with about 98% alpha-cellulose content. Unfortunately, the value of cotton fibers in the textile industry is too great to permit their general use in chemical processing, and only the short fibers left on the seed after ginning (linters) are cheap enough to be interesting as a chemical raw material.

In physical appearance, cotton linters resemble true cotton only slightly, but chemically they are as pure cellulose as staple cotton. Three grades are recognized according to their fiber lengths: first cut, second cut and mill run.

The cotton seeds, after ginning to remove staple cotton, are passed through a cleaning apparatus which is designed to remove the "field trash"—sand, leaves, pieces of the cotton boll and the like. The seeds then go to the linter machine where they pass between disc saws, set close together and revolving at high speed. Usually a "first cut" of fibers is taken off and the seeds are passed on to another machine where a "second cut" is made. In some mills all the fibers to be removed are taken off in one cut, known as "mill run."

"First cuts" can be garnetted or carded, and consequently chemical use must compete for them with applications in upholstery and mattresses. They are also sometimes used in spinning to replace the lower grades of cotton. Other uses for "first cuts" are cotton batting, absorbent cotton, wicking and rope. The staple length may run from ½" to 1¼". The percentage production of "first cut" may vary considerably but it averages about 25 lbs. to the ton of seed.

"Second cuts" are the chief source of supply for chemical cellulose. The staple length may range from ⅛" to ½" and the production may vary from 35 lbs. to 150 lbs. per ton of seed.

"Mill run" linters include all of the "first cut" and the best of the "second cut," sometimes all of the "second cut," and production may run from 35 lbs. to 150 lbs. per ton of seed.

The linters are prepared for use as chemical cotton by cooking with alkali under pressure, washing, bleaching and washing again. Little of the cellulose is destroyed in these processes which are designed to remove the natural gums and waxes as well as dirt and bits of hull cut from the seed with the fibers.

Table I shows the annual United States production, consumption, and exports of cotton linters from 1917 to 1937, inclusive. The production figures are the

Table I

COTTON LINTERS

United States Production, Consumption and Exports

Year	*Production* (Thousands of bales of 500 pounds)	*Consumption* (Thousands of bales of 500 pounds)	*Exports* (Thousands of bales of 500 pounds)
1917	1,096	1,119	188
1918	910	458	72
1919	595	342	53
1920	640	537	116
1921	382	639	132
1922	591	646	41
1923	640	537	116
1924	858	659	191
1925	1,044	804	104
1926	1,042	806	257
1927	875	780	193
1928	1,086	879	186
1929	1,038	805	118
1930	824	714	112
1931	876	637	116
1932	741	761	184
1933	801	767	169
1934	805	719	205
1935	876	734	241
1936	1,131	817	*
1937 (est.)	1,750	*	*

* Data not yet available.

Production statistics relate to the growth year beginning in August. Consumption and export statistics relate to the 12 months beginning August 1, of the year noted. Data furnished by U. S. Department of Commerce, Bureau of the Census, Cotton and Cottonseed Products.

total production for all purposes, about 60 per cent. of which (except in the years 1917 and 1918) was used for mattresses, upholstery and other non-chemical purposes.

In Table II the total production of cotton linters for a typical year ending July 31, 1937, is broken down

Table II

COTTON LINTERS

Production of Principal States for 12 Months Ending July 31, 1937

State	*Bales of 500 lbs. net*
Mississippi	308,556
Texas	235,600
Arkansas	166,166
Georgia	122,015
Tennessee	116,844
Alabama	76,168
Louisiana	74,893
North Carolina	61,789
South Carolina	60,930
California	56,770
Oklahoma	25,620
All other states	51,945

Data furnished by U. S. Department of Commerce, Bureau of the Census, Cotton and Cottonseed Products.

into production by states. It will be seen that the production of cotton linters in the United States is confined chiefly to nine Southern states, with Mississippi, Texas, and Arkansas leading the others in the order named.

Spruce wood was the first type of wood used for the manufacture of chemical cellulose. Spruce bleached sulfite pulp has been and is being supplied largely from New England and Eastern Canada. Various investigators have determined the cellulose content of spruce wood to be between 50 and 60 per cent. The approximate average constituents of dry spruce wood are given in Table III.

Table III

APPROXIMATE AVERAGE CONSTITUENTS OF DRY SPRUCE WOOD

	Per Cent. by Weight
Cellulose	52
Lignin	29
Fats and resins	3
Pentosans and hexosans	14

Data furnished by Sigmund Wang of the Canadian International Paper Company, for the Rayon Handbook, 2nd Edition, 1936.

Since 1929, increasing amounts of western hemlock have been used for this purpose. It is estimated that at the present time more than 40 per cent. of the domestic consumption of chemical wood pulp is supplied by western hemlock from the states of Washington and Oregon and from British Columbia.

In the last few years, fast growing southern yellow pine from South Carolina, Georgia and Florida has received considerable attention. It is claimed that

Table IV

CHEMICAL ANALYSIS OF SOUTHERN YELLOW PINE PULPWOOD

Species	*Growth Rate*	*Cellulose* %	*Alpha Cellulose* %	*Lignin* %	*Pentosans* %
Longleaf	Fast	58.8	44.3	27.9	12.4
Longleaf	Slow	57.7	44.8	28.7	11.0
Shortleaf	Fast	62.2	47.2	26.4	12.1
Shortleaf	Slow	62.9	48.0	27.0	11.8
Slash	Fast	60.5	45.7	27.3	12.3
Slash	Slow	62.3	47.9	26.5	11.0
Loblolly	Fast	59.3	43.3	28.1	12.6
Loblolly	Slow	61.4	46.9	27.5	12.6

Paper Trade Journal *105*, No. 20, 39-46 (1937).

satisfactory viscose rayon can be commercially produced from southern-pine pulpwood. The percentages by weight of cellulose and other constituents in several types of southern pines are shown in Table IV.

Still more recently, certain types of northern hardwood have been studied for their suitability as a source of supply for chemical cellulose. Hardwood fibers are shorter than spruce fibers, but possess sufficient felting property to form sheets suitable for chemical processing. In the treatment with 18 per cent. sodium hydroxide preparatory to xanthation, the hardwood pulp sheets show considerably less increase in thickness and in volume than the softwood sheets. See Table V.

Table V

DIMENSIONAL CHANGES WHEN SOFTWOOD AND HARDWOOD PULP SHEETS ARE IMMERSED IN 18% CAUSTIC SODA AT 20° C.

	Increase in Thickness %	*Increase in Volume* %
Softwood Sulfite No. 3	520	435
Softwood Alpha Fiber	227	200
Hardwood Sulfite	205	180
Hardwood Alpha Fiber	200	182

G. A. Richter; Rayon Textile Monthly *18*, 833-834 (1937).

Primarily wood is processed for paper manufacture, and for that purpose four principal methods are used: Mechanical, in which the wood is ground wet to yield an impure pulp direct; Sulfite, which dissolves the non-cellulose constituents in an acid calcium-magnesium sulfite liquor; Sulfate, which cooks out the undesired constituents of the wood with a solution of sodium sulfate in the presence of some caustic soda and some sodium sulfide; and Soda, whose refining agent is caustic soda lye. The yield of cellulose from wood is only about 42 to 44 per cent., although the wood contains from 50 to 60 per cent. by analysis, as shown above.

The acid "sulfite" process is preferred for chemical pulp. A good grade of cellulose prepared from wood by the acid sulfite process is usually more active chemically than cotton fibers: that is, (1) it is more easily

attacked than cotton by acetylating reagents, (2) it is more rapidly converted to xanthate to form smooth viscose solutions, and (3) it can be nitrated at lower temperatures.

Ordinary bleached sulfite pulp has an alpha cellulose content of 88-90 per cent. Where a purer pulp is required the ordinary grade may be further purified by a sequence of chlorination, hot dilute alkaline digestion, and alkaline bleach. In this way it is possible to refine a sulfite type of wood fiber to about 98 per cent. alpha cellulose and with only traces of lignin, resin or other impurities. Commercially this purified pulp will average about 95 per cent. alpha cellulose.

Sulfate pulp has not been extensively used as a chemical raw material for several reasons. It is not chemically very reactive toward the usual reagents, and hitherto it could be bleached only at the expense of considerable degradation. However, recent developments in the bleaching of this pulp seem to open the way for making it available in bleached form with a minimum of degradation, and this may open the way for the modification of existing methods of chemical treatment so as to permit its use.

Table VI shows the total United States production of wood pulp by processes. In Table VII the bleached sulfite production for the years of 1935 and 1936 has been subdivided to show the proportion used for chemical purposes.

Table VI

WOOD PULP

United States Production by Processes

Year	*Mechanical* (tons)	*Sulfite* (tons)	*Sulfate* (tons)	*Soda* (tons)
1917	1,535,953	1,451,757	84,799	437,430
1919	1,518,829	1,419,829	120,378	411,693
1921	1,267,382	1,166,926	140,760	300,533
1923	1,580,553	1,448,690	314,267	445,162
1925	1,629,689	1,447,191	412,690	472,647
1927	1,618,638	1,588,132	607,172	499,461
1929	1,649,112	1,737,085	915,478	561,210
1931	1,459,355	1,453,194	1,036,113	460,682
1932	1,203,322	1,167,263	1,031,817	357,865
1933	1,201,796	1,353,088	1,263,530	457,790
1934	1,298,204	1,472,306	1,253,932	411,686
1935	1,359,721	1,605,690	1,472,735	487,523
1936	1,475,620	1,821,842	1,794,734	557,695
1937 (est.)	1,600,000	2,200,000	2,200,000	*

* No estimate available.
Data furnished by U. S. Department of Commerce, Bureau of the Census, Forest Products Division.

Table VII

PRODUCTION OF BLEACHED SULFITE PULP

	1935 (tons)	1936 (tons)
Superpurified	63,066	108,600
Rayon and special chemical grades	126,470	198,994
Other grades	755,084	820,345

Data furnished by U. S. Department of Commerce, Bureau of the Census, Forest Products Division.

Table VIII

CHEMICAL PROPERTIES OF TYPICAL CELLULOSE TYPES USED AS CHEMICAL RAW MATERIALS

	Cotton Linters	*Ordinary Chemical Pulp*	*Purified Chemical Pulp*
Alpha Cellulose (%)	98	87–90	95–96
Ash (%)	0.1	0.1–0.15	0.06–0.1
Iron as Fe_2O_3 (%)	0.0015–0.0035	0.0015–0.0022	0.0012–0.0018
Ether soluble (%)	0.15	0.09–0.5	0.02–0.08
Soda soluble (%)	1.0–3.5	11.0–14.5	5.0–8.0
Copper number	0.15–0.25	1.6–2.0	1.0–1.1

Rayon Year Book, Second Edition, 1936.
G. A. Richter, Rayon Textile Monthly *18*, 833-834 (1937).

Table IX

AVERAGE PRICES* FOR BLEACHED COTTON LINTERS OF THE QUALITY USED AS A CHEMICAL RAW MATERIAL

	$ per lb.		*$ per lb.*
1921	0.067	1930	0.085
1922	0.15	1931	0.061
1923	0.15	1932	0.055
1924	0.127	1933	0.05
1925	0.12	1934	0.064
1926	0.09	1935	0.088
1927	0.08	1936	0.081
1928	0.095	1937	0.065
1929	0.09		

* The above figures are average prices over the year. In 1931 there was a variation of from 0.06 to 0.0875; in 1934, from 0.05 to 0.083; and in 1937, from 0.0875 to 0.055.

Cotton was the original source of cellulose for the nitrocellulose, cuprammonium and cellulose acetate processes, whereas the viscose process began with wood pulp. Later, the viscose process used mixtures of linters and wood pulp, at one time blending as high as 50 per cent. cotton linters with the wood pulp. The present tendency is to use linters in the proportion of not over 30 per cent., and several viscose producers are now using wood pulp exclusively. Considerable nitrocellulose is being made from specially purified wood pulp, and it has been reported that cellulose acetate is also using similar raw material to some extent.

Although cotton linters has the highest natural alpha-cellulose content, the improvements in the technique of purifying wood pulp have resulted in making it a serious competitor of cotton linters for all types of chemical processing. The chemical behavior of high alpha cellulose wood pulp is closely comparable to the behavior of a purified cotton when each is subjected to the same reactions.

A comparison of the average chemical properties of purified cotton linters with those of ordinary chemical wood pulp and of specially purified wood pulp is given in Table VIII.

Price has been an important factor in stimulating the trend toward wood pulp. Not only has the price of linters for chemical purposes generally been higher than that of wood pulp, but also the price fluctuations have been much wider, as shown in Tables IX and X.

During the past ten years, the price of bleached

Table X

WOOD PULP PRICES IN THE UNITED STATES

Year	*Domestic Bleached Sulfite*[1] (Dollars per Ton)	(Cents per Pound)	*Rayon Grade Sulfite*[2] (Cents per Pound)
1928	80	4.00	4.5
1929	75–80	3.75–4.00	4.5
1930	65–75	3.25–3.75	4.5
1931	45–65	2.25–3.25	4.5
1932	35–45	1.75–2.25	3.5
1933	35–60	1.75–3.00	3.5
1934	55–60	2.75–3.00	3.5
1935	50–55	2.50–2.75	3.5
1936	50–60	2.50–3.00	3.5
1937	55–75	2.75–3.75	4.5

[1] Price ranges for grades other than rayon.
[2] Average prices for pulp suitable for use as a chemical raw material. Does not include the superpurified pulp of high alpha-cellulose content.

Table XI

COTTON LINTERS VS. WOOD PULP

Estimates of Consumption for Rayon

Year	*Cotton Linters* (lbs.)	*Wood Pulp* (lbs.)
1934[1]	56,000,000	180,000,000
1935[2]	75,000,000	175,000,000
1937[3]	80,000,000	280,000,000

[1] Wood Chemical Industries of Washington, Thomas Doumani, University of Washington (1937).
[2] Farm Chemurgic Council, 2nd Dearborn Conference, G. P. Hoff (1936).
[3] Rayon Organon, March, 1938.

cotton linters as used for chemical purposes varied from about 5 cents in 1932 and 1933 to 9 cents in 1929, and 8¾ cents in 1935; whereas the price of regular sulfite pulp such as used by the viscose industry has held between 3½ and 4½ cents per pound since 1925.

In comparing prices of the different forms of cellulose used as chemical raw material, several factors must be kept in mind, all of which may be summed up in the fact that, in general, the higher the alpha cellulose content of the cellulosic material, the higher the yield of the product produced by the chemical treatment. This is one of the factors which have led to the development of super-quality wood pulps which often command a premium of as much as $25.00 per ton.

Table XI gives an approximate idea of the relative amounts of cotton linters and chemical wood pulp used in the manufacture of rayon.

Numerous varieties of trees have been studied as sources of the increasing quantities of cellulose needed by modern civilization, and some of them, notably fast growing hybrids, particularly of the poplar family, and pines in our southern states, offer promise of materially shortening the growing period of pulp forests. This is significant in view of the 40-year cycle of planting, growth and harvesting of present northern spruce forests.

By reducing the growing cycle of trees, the forest area necessary to supply a mill and the average distance over which wood must be transported can be greatly reduced. Thus in an area where a 20-year cycle prevails, as it does in the southern pine lands, the acreage of forest needed per annual ton of pulp is half as great as with spruce, and the average haul of the wood only one fourth as long. Poplars having a growth cycle from seed to pulp wood as short as ten years have been grown and promise still more important reductions in required forest area.

Despite these reductions in the time required to grow trees, many investigations are in various stages of progress which have as their object the adaptation of annual crops to the supplying of cellulose.

The Pomilio process for the pulping of wheat and flax straw by chlorination is in successful commercial practice in the Argentine and in Italy. In this process, the straw is first treated with 1 per cent. caustic soda at 80° to 90° C., the excess liquor is pressed out and the non-cellulose constituents are rendered soluble by treatment with chlorine gas. The yield from wheat straw is claimed to be 45 per cent. Despite its success elsewhere, this process is not yet used in the United States.

Various crop wastes such as cornstalks, sugar cane bagasse, and cereal straws, have attracted serious attention, but several factors have prevented their commercial utilization in the United States as sources of purified cellulose. The accumulation of sufficient stocks of these raw materials and their storage from time of harvesting throughout the year, without thereby incurring charges too great for their value to bear, has been a difficulty only less serious than the production problem consequent on their large bulk in comparison with wood.

Because straws and like wastes are customarily left on the farm where individual quantities are not great,

Table XII

RAYON

Production in the United States

Year	*Total* Thousands of Pounds	*By Process* Regenerated Cellulose (%)	Cellulose Acetate (%)
1917	6,545	..	..
1918	7,385	..	..
1919	8,280	..	..
1920	10,230	..	..
1921	14,990	..	..
1922	24,065	..	..
1923	34,960	..	..
1924	36,330	..	..
1925	51,050	..	..
1926	62,695	..	..
1927	75,555	..	..
1928	97,230	..	..
1929	121,900	93	7
1930	127,685	92	8
1931	161,760	90	10
1932	135,770	86	14
1933	215,600	81	19
1934	210,520	82	18
1935	262,760	78	22
1936	290,025	77	23
1937 (9 months)	237,300	76	24

Rayon Organon, Textile Economics Bureau.
Data by process not available prior to 1929.

the collection problem of a pulp mill of economical size becomes serious. The open texture of these materials and their very low specific gravity necessitate that processing vessels required to provide economical output be much larger than those used for wood, and hence more expensive to build. The quantities of reagents needed in the customary pulping processes are similarly great and thus introduce special problems of recovery. The Pomilio process overcomes these difficulties by working at atmospheric pressure, and by using its principal reagent, chlorine, in gaseous form.

Three types of cellulose derivatives are made commercially: esters, ethers and regenerated cellulose.

Cellulose nitrate is giving way before the growing use of cellulose acetate, possessing the important advantage of non-flammability, in the field of esters. Experimental manufacture has produced a number of other esters, and a few of them such as the aceto-propionate and aceto-butyrate are available on the market in limited quantities.

The ethers are becoming more and more important as their values are realized and methods of manufacture are perfected. Methyl, ethyl and benzyl ethers of cellulose are now commercial.

The regeneration of cellulose, by which is meant the conversion of the raw material to a workable compound, its fabrication into desired form, and finally the reconversion of the compound to the original cellulose, is really an important bit of industrial legerdemain. The cellulose is converted to a xanthate solution (viscose process), to the nitrate which can be dissolved in suitable solvents (Chardonnet process), or dissolved in an alkaline copper solution (Bemberg process). After solution, the material can be shaped at will and subsequent treatment regenerates the original cellulose in the desired form, which may be filaments, ribbons, or sheets, of rayon or Cellophane. Hence, these processes are of greatest commercial importance.

Historically, the first application of cellulose was that of the nitrate as an explosive (guncotton and smokeless powder) and as a plastic (Celluloid). Present applications of the wide variety of present cellulose derivatives include:

Rayon	Textile coatings
Plastics	Photographic films
Lacquers and enamels	Cellophane
Laminated Glass	Molding Powders

The economic significance of some of these is shown in Tables XII-XV, inclusive.

Cellophane by 1932 had reached an annual production of 12 to 14 thousand tons in the United States. Japan in the meantime entered this manufacture, and in 1934 produced at the rate of 170 tons per month, a rate since doubled.

Laminated glass, particularly valuable in safety of automobiles, reached an annual production of 90 million square feet in 1936 and is still growing.

Table XIII

CELLULOSE PLASTIC PRODUCTS

Production in the United States

(Thousands of Pounds)

Year	*Nitrocellulose*				*Cellulose Acetate*
	Sheets	*Rods*	*Tubes*	*Total*	*Total*
1927	*	*	*	16,298	*
1929	*	*	*	16,991	*
1931	*	*	*	12,008	*
1933	9,508	1,902	506	11,916	2,482
1934	9,772	1,771	818	12,361	4,826
1935	12,528	2,739	938	16,205	10,504
1936	13,220	2,786	929	16,935	13,036
1937	13,583	3,158	982	17,723	13,235

* Data not available.

Data furnished by U. S. Department of Commerce, Bureau of the Census, Cellulose Plastic Products.

Table XIV

PYROXYLIN LACQUERS

Production in the United States

Year	*Clear Lacquers* (Gals.)	*Lacquer Enamels* (Gals.)	*Total* (Gals.)
1923	*	*	3,255,857
1927	7,738,079	10,757,852	18,495,921
1929	9,938,501	15,150,807	25,089,308
1931	8,096,582	8,705,436	16,802,018
1935	9,332,624	11,760,134	21,092,758

* Data not available.

Data obtained from the Census of Manufactures for 1935, prepared by the U. S. Department of Commerce, Bureau of the Census.

Table XV

PYROXYLIN-COATED TEXTILES

Production in the United States

Year	*Light Goods* (Thousands of Linear Yards)	*Heavy Goods* (Thousands of Linear Yards)	*Pyroxylin Spread** (Thousands of Pounds)
1931	15,251	14,124	31,676
1932	12,942	10,723	24,442
1933	16,639	15,369	34,116
1934	21,837	17,594	42,953
1935	30,528	19,061	51,564
1936	35,914	21,807	62,163
1937	38,377	23,254	65,786

* Based upon 1 lb. of gun cotton to 7 lbs. of solvent, making an 8 lb. jelly.

Data furnished by U. S. Department of Commerce, Bureau of the Census, Pyroxylin-Coated Textiles.

Acetic acid, acetone and methanol were once produced solely by the destructive distillation of cellulose. Today this is less important as a source of these important compounds than synthetic processes which yield each of them cheaply. Of some significance here, but vital in Germany, are processes for acid hydrolysis of cellulose to fermentable sugars from which ethyl alcohol or cattle feeds can be made.

Fears of shortages of cellulose in the face of growing demands for it in paper and in chemical derivatives are groundless. Processes for utilization of crop wastes as sources of cellulose already exist or can be readily developed when and if economic need for them arises. It seems probable, however, that trees will continue our principal reliance for this raw material well into the future. In the meantime, advancing technology is supplying even more methods of utilizing cellulose for necessities as well as luxuries.

Safety Hints
for Liquid Chlorine

By C. H. S. Tupholme

SAFE handling of liquid chlorine has been given much study in Britain lately, and the Factory Department of the Home Office has issued a helpful memorandum. In this it is pointed out that no liquid chlorine should be discharged from any container unless the person in charge is trained to take all proper precautions. Cylinders and drums containing liquid chlorine should:

(a) be stored under cover, preferably on a ground floor, not in the main building and not near any exit;

(b) be protected from any source of heat or damp;

(c) not be stored or placed in the neighborhood of any inflammable material or plant in which fire or explosion is liable to occur;

(d) be so stored or placed as to allow of ready removal in case of fire; with the last point, as well as convenience in handling, in view, cylinders, where practicable, should be kept on wheeled racks.

If the valve of a chlorine cylinder is not easily opened great force should not be applied nor should lubricants be applied to valves which have become stuck. The supplier's directions should be strictly followed. Heat should never be applied to containers to assist the liberation of chlorine gas.

When cylinders are not in use the protecting caps should be screwed down over the valves. The valve outlet should also be protected by the cover nut which should always be screwed home when the cylinder is not in use. The protecting cap prevents damage to the valve, while the outlet cover nut protects the valve spindle and its seating from moisture. Unnecessary strains in the connecting pipe from the container should be prevented either by a coil or circular bend in the pipe or by other suitable means. The "stirrup" form of coupling is recommended for connecting the pipes to the valves.

When a chlorine tank car is being unloaded the switch on the siding should be padlocked or other precautions taken to prevent other cars being shunted into it.

A water supply with a hose for connection thereto should be readily available, so that, in case of an outbreak of fire near to cylinders or drums, they may be kept cool by spraying with water.

It is essential that the compressed air for use with liquid chlorine in tank cars and storage tanks should be perfectly dry and free from lubricating oil, otherwise the presence of moisture alone or moisture and oil will cause corrosion inside the tank.

As far as possible cylinders should be used only in rooms which are open to the air. When the use of containers in a confined space is unavoidable efficient exhaust fans working at low level should be provided to keep the air free from gas. Leakage of chlorine from connections may easily be traced by means of the white fumes produced by blowing air through ammonia in a reversed wash bottle, the ammonia being directed to any suspected point of leakage. When a container leaks the point of leakage should be turned upwards so as to prevent leakage of liquid.

On a substantial escape of gas occurring the following precautions should be observed:

(1) Keep to the windward side of the gas and warn people in the vicinity.

(2) Put on gas mask.

(3) If in a building, open all doors and windows and leave the building until clear of gas.

(4) The gas should be shut off as soon as possible taking care to avoid trapping liquid in the system, otherwise than in the containers.

Before the Doctor Comes

All persons who have been gassed with chlorine should be examined by a doctor, as serious symptoms may develop at a later stage. Until a doctor arrives, the following treatment should be administered:

(1) Carry the patient into a pure warm atmosphere, free from drafts, and loosen the clothing at the neck and waist.

(2) Keep the patient at rest, remembering that an occasional change of position from lying down to sitting up may be beneficial. Reassure the patient and encourage him or her to suppress the desire to cough.

(3) Apply warmth in the form of hot water bottles, blankets and any of the following drinks:

(a) One or two teaspoonfuls of glycerine in a tumblerful of soda water.

(b) Hot sweetened coffee or tea to which a lump of butter has been added.

(c) In mild cases, a teaspoonful of linctus diamorphinae camphoratus (B.P.C.) or of elixir-terpin hydrate-cumethylmorphine-hydrochlor (B.P.C.) will relieve the desire to cough.

(4) Relief will be obtained by inhalation of a steamy atmosphere from a bronchitis kettle or from a vessel containing two teaspoonfuls of tincture of benzoin in a quart of hot water.

(5) In more severe cases, where the patient is cyanosed, oxygen, or oxygen diluted with 7½ per cent. carbon dioxide should be administered. If the cyanosed patient is conscious and has not yet vomited, an emetic may be given, e.g. two tablespoonfuls of salt in a tumblerful of warm water. This should be repeated until vomiting occurs.

(6) If breathing is weak or has ceased, apply artificial respiration by Schafer's method, combined with administration of oxygen, or oxygen diluted with 7½ per cent. carbon dioxide.

CREATING INDUSTRIES
1918—1938

A Series of Fifty Articles Reviewing the Progress of American Chemical Industry

Electrolytic Chemicals

By Alexander Lowy



Organic chemicals by electrolysis is one of those entirely new phases of industrial chemical production that hold forth epoch-making possibilities, and the University of Pittsburgh's (Professor of Organic Chemistry) Alexander Lowy has from the first sensed the far-reaching importance of this development and followed it closely. He has lectured on organic electrochemistry before a number of learned societies, and he has digested thoroughly its economic implications as shown in the review printed herewith. He is Columbia trained, receiving his B.S. degree in 1911, M.S. 1912, and Ph.D. 1915. Since 1918 he has been at the University of Pittsburgh. During 1926-27 he was chairman of the Pittsburgh Section of the A. C. S., and 1932-35 vice president of the Electrochemical Society, serving it also since 1931 as chairman of its Publications Committee. He has written text-books on organic chemistry and contributed the chapter on "Industrial Organic Chemicals and Dye Intermediates" to Rogers' Manual of Industrial Chemistry. He is a member of Sigma Xi, Phi Lambda Upsilon, and Sigma Alpha Mu fraternities.

Fertilizer Compounds

By Charles H. MacDowell

Nitrogen and phosphorus have during the past twenty years made such important chemical progress that they have been treated separately in this series, but to C. H. MacDowell has fallen the weighty task of appraising the economic effects of this progress and other chemical developments in the field of plant foods. He is the country's undoubted outstanding authority on this subject. Starting as secretary to Philip Armour, he advanced rapidly in the organization of that pioneer industrialist. Mr. MacDowell organized the architects' department of that company; the fertilizer by-products department; the Armour Soap Works, and the Armour Fertilizer Works from which he retired as president in 1932, being at that time also a vice-president and director of Armour & Co. His public services have been distinguished. During the War he served on the War Industries Board, and was an economic adviser at the Versailles Conference. He was four years president of the National Fertilizer Association, has received D.Sc., the U. S. Distinguished Service Medal, and been decorated by Belgium, France, and Italy.



This Series of Articles will be Continued Each Month

Electrolytic Chemicals

1918—1938

By Alexander Lowy

TREMENDOUS progress in electrical engineering during the past decade, resulting in cheap electric power, has increased the electrical production of chemicals, metals, alloys, etc. In earlier days, a few electrochemical plants were scattered over the country, but with the development of cheap hydro-electric power at Niagara Falls these industries became more centralized. There, today, huge electrochemical industries flourish. Within more recent years, however, the federal hydro-electric projects such as the Tennessee Valley Authority, Boulder, Bonneville, Grand Coulee, Seminol, Kennett, and Fort Peck, have been planned to furnish tremendous quantities of cheap electric power. Thus, our natural resources may be utilized in widespread sections of the country to build up our electrochemical and electrometallurgical industries.

Electrochemical products are the chemical substances produced by the utilization of electricity. Electric power may be used as follows:

1.—In electric furnaces merely to create high temperatures for the making of electric steels, various alloys, fused quartz, etc.

2.—For electrothermic reactions such as for the production of carborundum, calcium carbide, graphite, and electrometallurgical products.

3.—In electrolytic processes such as in the production of chlorine, electroplating, electro-refining of metals, deposition of rubber, organic chemicals, and the production of aluminum, magnesium, sodium, etc. from fused electrolytes.

Besides the above classification, there are other processes where electricity plays an important role in chemistry, industry, and modern civilization.

Since the chemicals under numbers (1) and (2) are discussed in other papers of this series, this chapter will deal only with those included under item number (3). The subject of electrolytic chemicals is so extensive that a table must give a general summary of the more important chemicals under this topic.

In this table appear several new electrolytic industrial processes for chemicals with their respective uses. The laboratory and plant-scale researches are mainly responsible for this extensive development.

For many years electroplating was an empirical art. Electroplaters considered many of their plating bath formulas to be secret. However, this rule of thumb method is gradually disappearing, replaced by scientific study and control. Today a progressive electroplater will have many types of new scientific equipment to aid him in his practice.

While research and scientific control have accomplished wonders in every branch of the electroplating industry within the past decade, the outstanding contribution is the newly developed chromium and cadmium plating processes. These new types of coatings possess many exceptional properties.

Chromium plate is very hard and has a brilliant lustre. It resists corrosion, deterioration, and discoloration under ordinary conditions. Adherent coatings can be deposited on metals and alloys. Even mirror-like finishes can be produced. It can stand high temperatures and is resistant to most acids and to wetting. With these characteristic properties, it is not surprising that chromium plate has been so extensively adopted in many industries where hardness, wear resistance, and decorative effects are of paramount importance. It is most extensively used in the automobile and plumbing industries, cutlery, hardware, coating for dies, gauges, molds, printing plates, etc.

Cadmium plate is mainly used as a rust-proofing agent. It is bright, dense, and ductile. It possesses the protective value of zinc and the appearance of unpolished nickel. It does not corrode as rapidly as zinc coating and is less reactive to chemical agents. It is an ideal anti-corrosive surface coating for steel.

A new method has been developed for the electrodeposition of tungsten from aqueous solution. This metal also deposits as a smooth, hard, silvery coating with high lustre. Tungsten coating has a remarkable acid resisting property and so is a desirable protective coating for other metals.

Aluminum may be electroplated with nickel. Anodic oxidation coatings on aluminum for protection against corrosion, particularly where the alloys are used in aircraft or for decorative purposes, have found increasing applications. This type of coating has absorptive properties, so that the coatings may be dyed various colors.

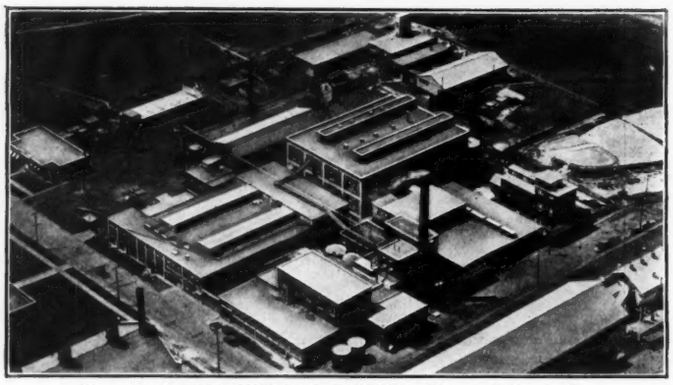
TABLE I

Products Prepared by Electrolytic Processes

Product	Prepared from	Uses
Aluminum	Fused cryolite and aluminum oxide.	Light weight alloys, cooking utensils, power transmission, resistant coating.
Ammonium persulfate	Ammonium bisulfate solution.	Oxidizing and bleaching agent, batteries.
Anthraquinone	Oxidation of anthracene.	Chemicals, dyestuffs.
Barium	Fused barium chloride.	Alloys, electron emission.
Beryllium	Fused beryllium chloride and sodium chloride.	Copper hardener, deoxidizer, light alloys.
Bismuth	Bismuth chloride and hydrochloric acid solution.	Alloys, bearing metals.
Cadmium	Cadmium cyanide solution.	Plating, alloys, amalgams, deoxidizer.
Calcium	Fused anhydrous calcium chloride.	Alloys, lead hardener, deoxidizer, radio tubes, increases conductivity of aluminum.
Calcium gluconate	Glucose and calcium bromide solution.	Medicinal.
Cerium	Fused cerium chloride and sodium chloride.	Pyrophoric alloys.
Chlorine	Sodium or potassium chloride solution.	Chemicals, bleaching, hydrochloric acid, military poison gases, water purification, detinning, metallurgy.
Chromic acid	Oxidation of chromium sulfate solution.	Chromium plating, chemicals.
Chromium	Chromic acid and sulfuric acid solution.	Plating, alloys.
Copper	Copper sulfate solution.	Chemicals, alloys, power transmission, plating.
Deuterium	Water.	Chemical for scientific use.
Fluorine	Fused potassium acid fluoride.	Chemical.
Frary metal	Fused barium and calcium chlorides with molten lead as cathode.	Bearing alloys.
Gold	Potassium gold cyanide solution.	Alloys, plating, jewelry, coins.
Hydrogen	Sodium hydroxide solution.	Chemicals, catalytic hydrogenation, synthetic ammonia, atomic hydrogen flame, hydrogenation of oils, oxy-hydrogen flame, balloons.
Hydrogen peroxide	Sulfuric acid solution.	Chemicals, antiseptic, bleaching, oxidizing agent.
Indium	Indium oxide in sulfuric acid solution.	Non-tarnishable silver alloy, jewelry, television.
Iodoform	Alcohol, potassium iodide, sodium carbonate solution.	Antiseptic, disinfectants.
Iron, electrolytic	Ferrous ammonium sulfate solution.	Electromagnetic purposes.
Lead	Lead fluosilicate solution.	Alloys, plating, chemicals, pigments, lining of chemical equipment.
Lithium	Fused lithium and potassium chlorides.	Deoxidizer, lithium-lead cable sheath, light alloys.
Magnesium	Fused anhydrous magnesium chloride and sodium chloride.	Light weight alloys, pyrotechnics, deoxidizer, flashlight powders.
Mannitol	Reduction of glucose solution.	Esters, ethers, chemicals.
Nickel	Nickel sulfate solution.	Alloys, plating.
Oxygen	Sodium hydroxide solution.	Chemicals, oxyacetylene flame, medicinal, promoting fuel combustion.
Para-aminophenol	Reduction of nitrobenzene.	Chemicals, photographic developer, dyes.
Perchloric acid	Hydrochloric acid.	Salts of perchloric acid.
Platinum	Platinum chloride solution with ammonium and sodium phosphates.	Alloys, jewelry, catalyst, plating.
Potassium chlorate	Potassium chloride solution.	Explosives, safety matches, pyrotechnic compositions, oxidizing agent.
Potassium hydroxide	Potassium chloride solution.	Soap, chemicals, mercerizing cotton, electroplating.
Potassium perchlorate	Sodium chlorate solution and converted to potassium salt.	Oxidizing agent, explosives, medicine.
Potassium persulfate	Potassium sulfate solution.	Oxidizing agent, bleaching.
Rhodium	Rhodium sulfate solution.	Plating, alloys, reflectors.
Rubber	Latex containing the usual components for compounding rubber.	Household and industrial rubber goods.
Silver	Sodium silver cyanide solution.	Alloys, coins, jewelry, chemicals.
Sodium	Fused sodium hydroxide or sodium chloride.	Chemicals, sodium vapor lamp, amalgams, tetraethyl lead, deoxidizer for light alloys.
Sodium chlorate	Sodium chloride solution.	Weed killer, explosives, matches, oxidizing agent.
Sodium hydroxide	Sodium chloride solution.	Chemicals, soap, dyes, rayon, mercerizing cotton.
Sodium hypochlorite	Sodium chloride solution.	Bleaching, chemicals.
Sodium perborate	Borax and sodium carbonate solution.	Soaps, bleaching, oxidizing agent, germicide.
Sorbitol	Reduction of glucose solution.	Humectant, resins and plasticizers, vitamin C, chemicals.
Tantalum	Potassium tantalum fluoride.	Acid resistant lining for chemical equipment.
Thorium	Fused potassium thorium fluoride.	Electron emission, X-ray targets.
Tin	Sodium stannate solution.	Alloys, tin coatings, plating, chemicals.
Tungsten	Sodium tungstate solution.	Alloys, plating, electric bulbs.
Uranium	Fused potassium uranous fluoride.	Alloys.
White lead	Lead anode, sodium acetate and carbonate solution.	Paint pigment.
Zinc	Zinc sulfate or zinc cyanide solution.	Alloys, galvanizing, chemicals.

Speaking of "Things Chemical"
***—particularly the* New Electrolytic Chemicals**

Here is a RELIABLE, ALL-AMERICAN SOURCE OF SUPPLY



Plant of the ISCO CHEMICAL DIVISION, Niagara Falls, N. Y.

Until about two years ago, American consumers were dependent largely upon foreign sources of supply ● The necessity for this condition ceased when we started to make, in our up-to-date plant of the Isco Chemical Division, at Niagara Falls, N. Y., the excellent products listed below.

If you do not already know these products *through using them*, you will profit by making their acquaintance. Each is produced under conditions that reflect specialized experience and up-to-the minute equipment.

• CAUSTIC POTASH •
All forms and packages

Flake	Solid	Granular
Walnut	Broken	Liquid (iron free)

• IRON CHLORIDE •
Lumps and Liquid
Increased facilities make it possible for us to meet increased demands.

• CARBONATE OF POTASH •
Hydrated 83/85%, crystalline form. Calcined 98/100%
Fine Granular form, also Liquid 47%, water white.

IN ADDITION to these new products we have been producing for many years Electrolytic CAUSTIC SODA in all forms, Solid—Flake—Crystals and Liquid, in all standard grades.

• CHLORIDE OF LIME •
(Bleaching Powder)
35/37% free flowing.
Available also in our rubber bag containers, 10 lbs. each. Six to wooden case.

• LARVACIDE •
(Chlorpicrin)
For effective Insect and Rodent Control.

RUBBERMAKERS' LIME and other ELECTRO-CHEMICAL PRODUCTS

Quotations gladly furnished for delivery in containers of various sizes.

●

Put your industrial chemical problems up to us.

INNIS, SPEIDEN & CO.
Industrial Chemicals since 1816
117-119 LIBERTY STREET, NEW YORK
BOSTON • PHILADELPHIA • CLEVELAND • CHICAGO • GLOVERSVILLE, N. Y.

FACTORIES: Niagara Falls, N. Y.—Jersey City, N. J.

Iron may now be deposited electrolytically in sheets where the iron content may be as high as 99.965% pure.

According to the older method, nickel deposits had to be polished after being removed from the electrolytic bath. Direct bright nickel plating is now accomplished by the newer method which does not require polishing.

The latest development among the noble metals is the process whereby metallic rhodium is deposited on jewelry, silver, and on various types of reflectors.

Considerable advancement has been made in the direct electrodeposition of various alloy combinations, such as bronze, brass, copper-nickel, and lead-tin alloys.

In conclusion, it is noteworthy to mention with reference to electroplating that the bulk of the world's copper, silver, nickel, and gold is today refined electrolytically.

Production of Metals

The last twenty years have brought forth new metals and new applications of these metals, of which the most important one from the point of view of its industrial applications is magnesium, the lightest commercial metal. In 1914 the first magnesium was produced in this country at Niagara Falls, and its production has now risen to approximately five million pounds a year. In 1915 magnesium cost $5.00 per pound; in 1924 it cost $1.00; and by 1938 the price had fallen to 30c. Magnesium is now produced in the United States entirely by a continuous process by the electrolysis of a fused bath consisting of 70% magnesium chloride and 30% sodium chloride. The specific gravity of magnesium is ⅔ that of aluminum and ¼ that of iron and copper. Magnesium is used most extensively alloyed with very small percentages of other metals. Such alloys are employed chiefly in aircraft construction and in equipment where reduced weight is important, for example, large fans, vacuum sweepers, portable tools, etc. It is also used as a deoxidizer in the melting and refining of non-ferrous metals.

In addition to magnesium, the following metals have been produced on a more or less large scale: barium, beryllium, calcium, cerium, indium, lithium, tantalum, thorium, and uranium. Their preparation and uses are given in Table I. Some of the more rare metals have also been prepared electrolytically on a laboratory scale only; such as: yttrium, thallium, columbium, neodymium, zirconium, niobium, germanium, and gallium.

One of the outstanding common metals with considerable future possibilities is beryllium, which has some unique applications. It is a very light metal which takes a high polish and is not tarnished in air. It is two-thirds as heavy as aluminum. It is a very hard metal. The addition of two to two and a half per cent. of beryllium to copper or nickel produces alloys possessing properties like those of bronze. Small percentages of beryllium added to silver make it hard and resistant to tarnish.

The following inorganic chemicals have been made by electrolytic processes within the last twenty years: ammonium persulfate, "heavy hydrogen," fluorine, hydrogen peroxide, perchloric acid, potassium chlorate, potassium perchlorate, potassium persulfate, sodium chlorate, sodium perborate, and white lead. Their method of preparation and uses are briefly outlined in Table I.

It is particularly noteworthy that when sulfuric acid is electrolyzed and thereby converted to persulfuric acid, and this in turn is distilled, hydrogen peroxide is produced. It is stated that this hydrogen peroxide is superior to that produced from barium peroxide.

Organic Chemicals

In spite of the much searching laboratory work in the field of electro-organic chemistry, only comparatively few organic substances have been made on a commercial scale. The following have been so produced at one time or another, and these also are incorporated in Table I: anthraquinone, iodoform, and para-aminophenol. However, within the last two years, two new industrial methods dealing with electro-organic chemistry have been developed. These are:

1. Sorbitol and mannitol.
2. Calcium gluconate.

The industrial electrolytic production of the hexahydric alcohols sorbitol and mannitol is the first large scale application of electrolytic reduction in the organic chemical field. Up to 1937 both were merely scientific curiosities. Now they are manufactured on a large scale in this country. They are made by the electrolytic reduction of glucose (corn sugar). The glucose solution is electrolyzed in a multiple diaphragm cell. The hydrogen for the reduction is supplied by electrolysis of the water in the electrolyte, which also contains dissolved sodium sulfate. A few of their uses are included in Table I. Also, since a commercial supply of these chemicals is now available, many new organic compounds and products will undoubtedly be made from them, and additional uses will be discovered.

A new industrial method has been devised for the electrolytic preparation of calcium salts of sugar acids. The various sugars are electrolytically oxidized in the presence of calcium bromide and calcium carbonate. Calcium gluconate is now produced on an industrial scale by this method. It is used in medicine as a means of introducing calcium into the body. From the calcium gluconate other metallic gluconates and gluconic acid are produced. Future developments are awaited with interest in the utilization of these products.

Other Electrolytic Developments

In the industry electrodeposited rubber is known as the "Anode Process" for the production of rubber articles and coatings. This process represents one of

the greatest recent rubber developments. Rubber globules in natural latex and in various compounded rubber-water emulsions are negatively charged. When direct current is passed through such liquid, which is made slightly alkaline, the rubber particles migrate toward the anode and are coagulated. If to the rubber emulsions finely divided pigments, sulfur, fillers, accelerators, or dyes are added, and the resulting mixture is electrolyzed, the components of the mixture are electrically deposited uniformly on a metallic anode. By this method homogeneous layers of rubber of various thicknesses may be deposited on different objects. Since this electrolytically deposited rubber contains from thirty to sixty per cent. of water, the deposited product is dried and then vulcanized. Anode rubber has extraordinary strength, elasticity, durability, and insulating properties. Many specialties, such as gloves, balloons, bathing caps, drug sundries, etc., are manufactured by this process which is also applied to the continuous coating of metallic sheeting, wire, netting, and fabrics.

Water Purification

The purification of water by electrolysis in a diaphragm cell removes the negative ions (chloride, sulfate, and carbonate ions) practically completely. Especially in Europe this method of water purification is rapidly becoming of considerable importance.

Both in scientific and industrial laboratories the electrometric titration and pH determination equipments are being utilized, especially in control work of various chemical processes.

California and Gulf Coast crude oil emulsions are demulsified by using high voltage and low amperage electric current.

Milk is pasteurized at several large dairies by means of electric current between water cooled carbon plate electrodes. Alternating current is passed through the milk, which is evenly heated with a minimum exposure to either air or metals. This treatment destroys pathogenic bacteria and is known as the "Electropure Process."

A process has been perfected for the removal of gum-forming constituents from manufactured gas.

An apparatus has been devised for the purification of sugar and protein solutions on a semi-commercial scale by means of electrodialysis.

Cheaper Electrochemical Products

In general the price of electrochemicals has decreased. The outstanding reason is more economic production, which may be definitely credited to the results of research and the lower cost of electric power. Another reason may be the lower cost of natural raw materials.

Table II lists the comparative prices of a few products as given in market reports of 1918 and 1938.

Table II

Comparative Prices of Chemicals, 1918 and 1938

	1918	1938
Metals	*dollars per lb.*	*dollars per lb.*
Aluminum	.33	.20
Cadmium	1.90	1.35
Calcium	....	.75
Chromium	....	.85
Copper	.15	.10
Lead	.07	.05
Magnesium	1.81	.30
Nickel	.55	.35
Sodium	....	.19
Thallium	....	6.50
Tin	.54	.42
Titanium	....	6.00
Zinc	.08	.05
Zirconium	....	7.00
Chemicals		
Chromic acid	1.20	.16
Chlorine	.09	.05
Hydrogen peroxide (100 vol.)	....	.20
Iodoform	5.00	3.75
Mannitol	....	1.45
Potassium chlorate	.41	.09
Potassium hydroxide	.70	.07
Sodium chlorate	.20	.07
Sodium hydroxide	.05	.03
Sorbitol	....	.25

Table I summarizes the remarkable accomplishments of electrolytic processes up to 1938. With progressive research in the theoretical and practical phases of electrochemistry still only in its infancy, we look forward with interest and hope to the development of more efficient processes and new or improved products.

Industry's Bookshelf

Economic and Social Progress of the American People by Walter W. Jennings, Southwestern Pub. Co., Cincinnati, 811 pp. Though the sole reference to chemical industry is a scant couple of paragraphs on the manufacture of coal-tar dyes during the War period, nevertheless this book presents an interesting broad picture of the basic economic developments of this country.

Pharmaceutical Therapeutics by Eldin V. Lynn, McGraw-Hill Co., N. Y., 430 pp., $4.00. A rearranged and almost rewritten second edition in conformation with the new U.S.P. and N.F.

Crystal Chemistry by Charles W. Stillwell, McGraw-Hill, 429 pp., $4.50. A pioneer text-book on the principles governing the arrangement of atoms in crystals; the first exposition of the systematic crystal chemistry as a supplement to the teaching of inorganic chemistry.

The Robinson-Patman Act by Wright Patman, Ronald Press Co., N. Y., 408 pp., $4.50. What you can and cannot do explained by one of the authors of the bill. Naturally, a first hand authority discussing the problems that have arisen since the passage of this important legislation.

Fertilizer Compounds

1918—1938

By Charles H. MacDowell

THE chemical phase of the commercial fertilizer industry was born in a barn on the Rothamsted estate of a young chemist, John (later Sir John) Lawes, near Depford, England, in the research years 1836-40. He had used bone dust on his turnips. They did not respond, so he acidulated the bone with sulfuric acid; then he substituted spent bone black, and finally tried Suffolk caprolite, a calcium phosphate, securing good results with each material. He patented the process in 1841, and in 1842 began the manufacture of superphosphate for sale. In the same year he employed Dr. (afterwards Sir) J. H. Gilbert as laboratory assistant, and together they not only developed an important industry, but established the first agricultural experiment station.

The fertilizer industry developed as an assembler, manipulator, and distributor of compounds of nitrogen, phosphorus, and potassium, using sulfuric acid as its chief chemical reagent.

During the war blockades, shortage of shipping, and the withdrawal from the fertilizer field of material needed for munitions, interfered seriously with agriculture and with the international movement of fertilizer materials. German potash was unobtainable. The Central Powers were unable to secure phosphate rock. Farmers could not obtain nitrate of soda.

When Haber and Bosch undertook to develop and commercialize their synthesis of ammonia they faced the necessity of using pressures greater than any formerly used. After protracted trials they were successful. The problems confronting metallurgists were new, and much credit must go to them for contributions to their solution.

Before the war Ostwald had developed the Kuhlmann discovery (1839) whereby ammonia could be oxidized to nitric oxide by passing the gas mixed with air over a catalyst. This process provided the nitrate nitrogen the Central Powers could no longer secure from Chile. Synthetic nitrate of soda was manufactured at Oppau and shipped to munitions plants equipped for its use.

Another innovation was the substitution of gypsum (calcium sulfate) for sulfuric acid in the production of sulfate of ammonia. Finely ground gypsum churned in an aqueous solution of ammonium carbonate forms a solution of sulfate of ammonia and finely divided calcium carbonate. The latter is filtered off and the sulfate of ammonia evaporated and centrifuged. The carbonic acid used is a byproduct obtained in the production of hydrogen. The calcium carbonate is utilized in the production of calcium nitrate fertilizer or sold as agricultural lime. This process has survived the war and has been adopted by most of the European nitrogen plants. It is not used in America.

The success of the Haber-Bosch synthesis made plain that Chile need no longer be depended on for nitrate nitrogen. Research was stimulated and a number of processes developed, all based on the Haber synthesis, and production began in 1924. Improvements were made in catalysts and pressures ranging from 90 to 1000 atmospheres were adopted; hydrogen from byproduct coke gas and electrolytic and free hydrogen from fermentation processes was used; plants were simplified and manufacturing costs greatly reduced. The first United States plant (Allied Chemical) at Syracuse, N. Y., using relatively low pressure, began production in 1924. Later this company constructed a much larger plant at Hopewell, Va. Du Pont built a plant at Belle, W. Va., using a modified Claude-Casale process operating at above 900 atmospheres; other plants have been built, one at Trail, B. C. The U. S. Government Nitrogen Fixation Laboratory has contributed valuable research. The Nitrogen Engineering Company, an American organization, has constructed eleven foreign plants, one in Germany.

In 1936 nineteen countries were manufacturing synthetic ammonia, producing 1,650,000 metric tons of nitrogen in plants capable of producing 3,600,000 tons annually. The 1924 production was 333,000 tons. Excess capacity figures are somewhat misleading, however, as plants are being utilized for the synthesis of methanol and the hydrogenation of coal.

In the year ending June 30, 1937, a total of 2,594,000 tons of chemical nitrogen in all forms was produced, contrasted with 1,321,000 tons in 1924. World plant capacity is estimated at 5,400,000 metric tons. Consumption in 1937 was 2,675,000 tons, of which 2,344,000 tons was used in agriculture.

The price of sulfate of ammonia declined approximately 50% in the period 1926-1937. Chilean nitrate declined 54%.

The Haber high pressure synthesis and its ramifications gave chemists new tools, opening up new fields for exploration. Methanol was synthesized; cheap hydrogen and high pressure vessels made practical the hydrogenation of coal to secure petroleum substitutes; oil technology has been advanced; interest in catalytic

reactions has been stimulated; cheap ammonia has enlarged its field of use and has provided cheaper nitric acid for nitration processes.

With abundant ammonia, highly concentrated fertilizer materials were produced. The German I. G. Farbenindustrie were leaders in this step. Urea (46 per cent. N), diammonium phosphate (21 per cent. N and 53.4 per cent. water-soluble phosphoric acid), mixtures of calcium carbonate with urea, ammonium nitrate, nitric acid, and a line of complete fertilizers containing as much as 60 per cent. total available plant food were prepared.

There has been no strong trend toward highly concentrated complete fertilizers in the United States, although the average plant food content of mixed goods has shown a steady increase. Total plant food in mixed fertilizers in 1936 was twice greater (52.6 per cent.) than in 1910. There has been a growing production of triple superphosphate; ammonium phosphate is on the market; urea, anhydrous ammonia and solutions containing ammonia, ammonium nitrate, sodium nitrate and urea are produced in quantity. None of the calcium carbonate nitrate carriers have been manufactured here, although they are being imported, mostly from Norway.

Ammoniation

An important American technical development in the utilization of ammonia salts is known as ammoniation. The ammoniation of superphosphates originated in the Armour shop in 1926-27. It became feasible through the displacement by synthetic anhydrous ammonia or anhydrous made from aqua ammonia, which lowered the price of aqua ammonia so it could be used as a fertilizer material. Armour and Company were manufacturers of anhydrous ammonia from aqua, and the fertilizer works were able to utilize these materials without delay. They had researched the problem some years previously. All their plants were equipped with tight revolving drum mixers which blended materials quickly, with rapid dissipation of heat. The ammonia is fixed by the acids in the superphosphate.

At the new, lower price anhydrous ammonia was used where freights made it cheaper than aqua, and both materials were in use about a year before the practice became known. Later a patent was secured by the writer for an anhydrous ammonia: ammonium nitrate solution that could be shipped in ordinary tank cars rather than in the specialized equipment used for shipping anhydrous ammonia. The solution is being used extensively. Since the introduction of this technique other solutions have been developed, containing nitrate of soda or urea and shipped in the anhydrous ammonia type of tank cars.

More nitrogen can be introduced into mixtures with these solutions than by ammonia alone. At the present time well over half the superphosphate entering into fertilizer mixtures is ammoniated with liquids. The solutions contain from 45 per cent. to 55 per cent. ammonia. Prior to this innovation dry mixing of materials was the common practice. Many manufacturers were floor mixing. Solution mixing improves the mechanical condition of the fertilizer and permits more accurate chemical control.

Important Technical Advances

Other important technical advances have been made in the recovery of fertilizer materials and in the manufacture of fertilizers. One of these is the use of oil froth flotation in the Florida pebble phosphate mines, whereby fine rock formerly lost is recovered. The International Agricultural Corporation initiated this development, beginning their laboratory and pilot plant experiments in 1927. The first commercial unit began operations early in 1929. The application of this technology for the recovery of materials other than sulfides and oxides of metals was rather new. Minute tough-skinned oily soap bubbles in the water adhere to the phosphate particles in preference to the sand, and float the phosphate to the top where it is removed. Rock as fine as 150-mesh is recovered.

Florida pebble rock reserves have been increased fully a third by this development. Oil flotation is being used successfully in Russia in the concentration of low grade apatite. In Tennessee improved recovery methods are benefitting the grade rather than increasing the recovery.

There has been great improvement in equipment for the mining of rock. Walking drag line excavators with booms up to 175 feet in length remove overburden; pumps, washers, dryers and other equipment are larger and much more efficient. Mining costs have been reduced and prices lowered. Florida pebble rock basis 68% B.P.L. sold in 1923 at $3.08 a long ton f.o.b. mines; in 1937 it sold at $1.85 per ton.

Bulk superphosphate prices per unit of available phosphoric acid, f.o.b. Baltimore, have ranged from 57 cents in 1922, 61 cents in 1929, 43 cents in 1933, to 53 cents in 1937.

Since 1918 new sources of potash have been developed in Russia, Palestine, and New Mexico, U.S.A. The Searles Lake brine output is substantial. Manufacture began there in 1916 but a really satisfactory product low in borax was not secured until around 1925, much credit being given to the late Dr. J. E. Teeple and his research staff.

Potash as polyhalite was first identified in the Permean salt basin in New Mexico in a well drilled in 1921; sylvinite in 1925. The first shaft for mining sylvinite was sunk by the U. S. Potash Company near Carlsbad, New Mexico, in 1929, and production of mine run potash began in 1931. The Potash Company of America completed its first shaft in 1933. Another development is now being considered. The ore as mined contains 25 per cent. to 30 per cent. K_2O as sylvinite, the residue is halite, common salt.

The U. S. Potash Company concentrates to 99 per cent. potassium chloride by solution and fractional crystallization, the method commonly followed in Europe. The process is based on the fact that a hot saturated solution of potassium chloride and sodium chloride on cooling allows nothing but potassium chloride to crystallize out. Improvements in apparatus, alloys, etc., have permitted use of the latest technical advances.

The Potash Company of America have adopted an entirely new method of separating the potassium chloride from the crude ore by flotation, separating the potash crystals from the salt. The salts are ground and handled in a saturated solution of silvite and halite. In the process the halite is floated and the silvite depressed.

Potash prices are (1937) approximately 20% lower than in 1922.

Research has been done on the recovery of potash from polyhalite and langbenite, potash ores located by drillings in Texas and New Mexico, although these ores are not now mined. Little progress has been made in the recovery of potash from cement and blast furnace dust. The complex nature of the dust makes it difficult to separate the potash economically.

The substitution of sulfur for pyrites during the war has continued, and a substantial part of the sulfuric acid used in fertilizers, aside from by-product recovery, is produced from sulfur. Sulfur is more flexible than pyrites and permits larger production. Purifying the gas to prevent catalyst poisoning has been simplified in the manufacture of contact acid, production of which has increased substantially.

Recovery Chilean Nitrate of Soda

There have been outstanding technical advances in the recovery of Chilean nitrate of soda. The Shanks Process (1876) recovers approximately 65 per cent. of the nitrate in the caliche treated. The ore is largely hand mined, and only the richest deposits (12 per cent. minimum) can be utilized profitably. Fuel costs (40 per cent. of total) and labor costs (also 40 per cent. of total) are high. The Guggenheim Process (1927) mines mechanically, utilizes ores as lean as 8 per cent. nitrate, and recovers 85 per cent. to 90 per cent. of the nitrate in the ore. The heat necessary for the process is generated in the cylinders of Diesel engines. The fundamental difference between the Shanks and Guggenheim processes is that the former uses hot water (280°F.) and cools the solution to atmospheric temperature (70°F.), while the Guggenheim uses warm water (104°F.) and refrigerates the solution below atmospheric temperature (50°F.). The Guggenheim nitrate is prepared in pellet form and analyzes over 99 per cent. nitrate. The Shanks product analyzes 95-96 per cent. nitrate. Relatively little labor is required in the Guggenheim method, but overhead is heavy. Technically the process is an outstanding modern chemical engineering accomplishment.

The Allied Chemical Company converts a substantial portion of their Hopewell ammonia into synthetic nitrate of soda by oxidation, using sodium carbonate produced at another plant as a fixing alkali. They are also producing nitrate of soda and chlorine from common salt (NaCl) and oxides of nitrogen, by a new procedure.

Packing-house and fish factory organic offals, used by the fertilizer industry a few years ago, are now converted by improved rendering to stock and poultry foods, and relatively little of this material goes now into fertilizers. Nitrogenous materials made from leather, hair and other industrial waste, soy bean and peanut meals, dried activated sludge recovered from sewage, etc., are being used to replace packing-house materials.

Nearly all chamber plants now oxidize ammonia gas to nitric acid, discarding the old practice of acidulating nitrate of soda. This innovation has displaced some 40,000 tons of nitrate of soda yearly in the United States and resulted in substantial savings.

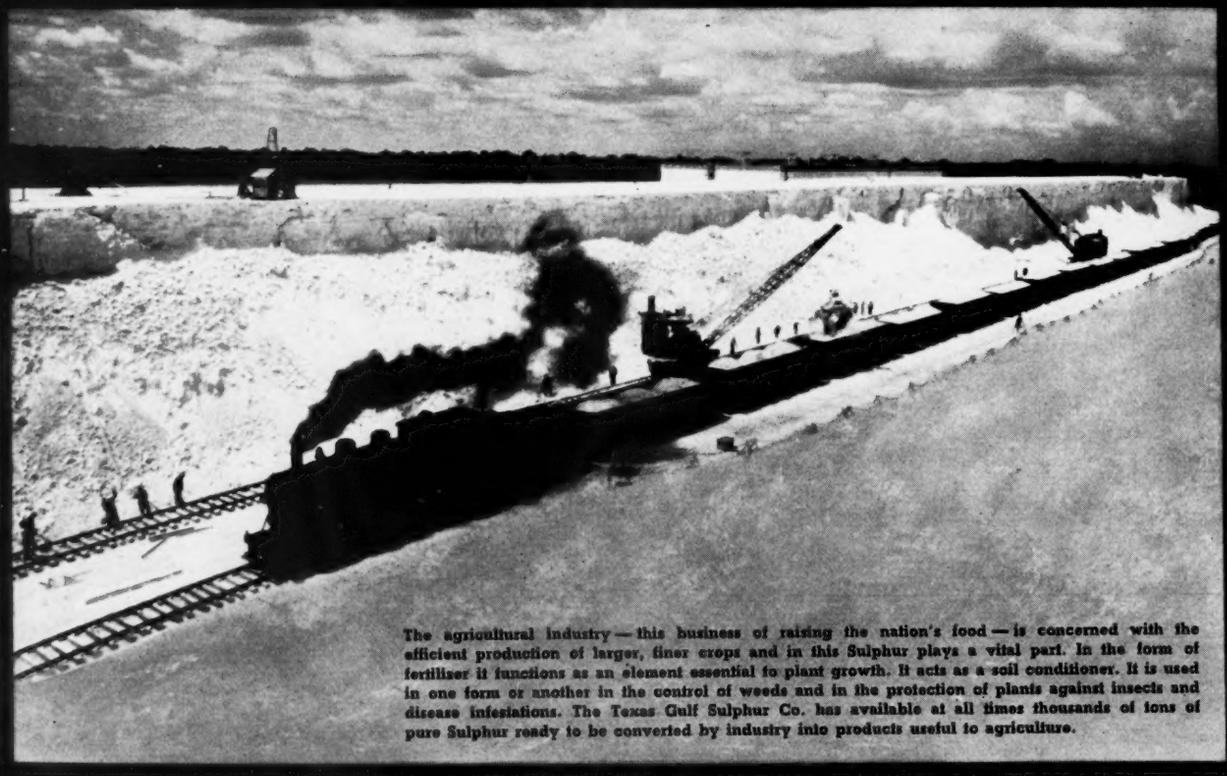
Superphosphate Processes

Processes for superphosphate production have developed to high chemical and mechanical efficiency. In early days a damp, sticky product analyzing 14 per cent. available phosphoric acid was acceptable. Improvement in grade and physical condition has come from the use of cleaned rock, attention to the amount, strength and temperature of the acid, the fineness of the rock, and finally the use of mechanical handling of the superphosphate. The first mechanical den, quick-curing system introduced in the United States was a Swedish development whereby the superphosphate was discharged into relatively small tight dens, where after crystallization it was pushed out against cutters.

Other systems have been developed in the United States. In the Sturtevant system the sides of relatively small dens are removed and the block of superphosphate is mechanically conveyed (not pushed) to cutters, shredded, and distributed. In the Oberphos method, distinctly novel, acidulation takes place in a hermetically sealed cylindrical mixer under steam pressure at a temperature of around 300°F. No fume or moisture is allowed to escape during the reaction period. A vacuum is then applied and the gases withdrawn; the heat of reaction dries the material and drops the temperature to 150°. The material is in nodular granules, with a moisture content of 4 per cent. to 5 per cent. It is understood that there is a substantial saving of acid per unit of available phosphoric acid, and that a 20 per cent. available phosphoric acid is being produced from 71 per cent. Florida rock.

Another American innovation, the Broadfield den, is extensively used here and abroad. Predetermined quantities of rock and acid are automatically measured and fed into a continuous mixer designed to retain the mixture from two to five minutes before discharge on to a sealed, moving conveyer type of den. The sulfuric acid and rock are continuously agitated and

SULPHUR and AGRICULTURE



The agricultural industry — this business of raising the nation's food — is concerned with the efficient production of larger, finer crops and in this Sulphur plays a vital part. In the form of fertilizer it functions as an element essential to plant growth. It acts as a soil conditioner. It is used in one form or another in the control of weeds and in the protection of plants against insects and disease infestations. The Texas Gulf Sulphur Co. has available at all times thousands of tons of pure Sulphur ready to be converted by industry into products useful to agriculture.



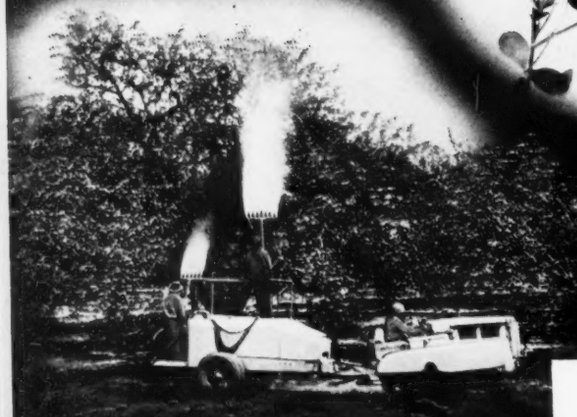
Sulphur reclaims alkaline soil.



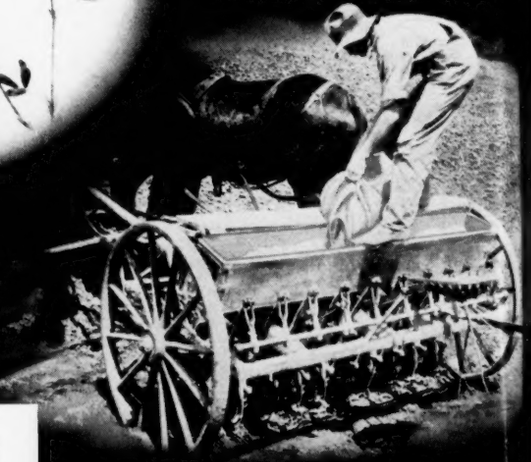
Alfalfa grown with and without sulphur-base fertilizer.



Sulphur protects vegetable



Sulphur protects growing fruit.



Drilling phosphate fertilizer.

TEXAS GULF SULPHUR CO.
75 E. 45th Street New York City
Mines: Newgulf and Long Point, Texas

kneaded after the initial mixing to establish intimate contact and liberate the fluorine and other gases formed during the reaction, which are withdrawn by a fan as produced. The acidulated material on its fifty minute travel on the movable den reaches a mechanical cutter at the end of the tunnel, which shaves the material off in very fine particles. It is then distributed to storage. Moisture is low. Everything is handled mechanically and little labor is required.

Triple superphosphate was first made in Europe years ago, chiefly for export. It costs more per unit to produce than normal superphosphate, and is not simple to manufacture. Liquid phosphoric acid is first produced from phosphate rock, then more rock is acidulated with this acid. The liquid phosphoric acid may be produced by various methods—sulfuric acid, electric furnace, or blast furnace.

In the acid process ground rock is treated with sulfuric acid in the approximate proportion of one ton of rock to one ton of 60° Baume acid which has been diluted with wash water from a previous cycle. The mixture is agitated, then filtered, and thoroughly washed to separate the phosphoric acid from the calcium sulfate. Better than 90 per cent. of the P_2O_5 content of the rock is recovered as crude dilute phosphoric acid analyzing from 18 per cent. to 30 per cent. P_2O_5. The Dorr Company have developed an especially efficient and economical system for this process in large scale operation. The phosphoric acid must be concentrated to about 50 per cent. P_2O_5 content before it is used to acidulate rock, an expensive and troublesome procedure.

The Meyers Process

The Meyers Process, developed at Mellon Institute by H. H. Meyers, dispenses with separate concentration of the phosphoric acid. It is in use here and in Sweden. In this process the requisite amount of ground rock is added to the crude dilute phosphoric acid from the filters, and the slurry formed is passed through a direct fired rotary dryer concurrently with the hot gases. As the acid reacts with the rock, water is evaporated.

Acidulation with nitric acid is carried out to some extent in Europe. The theoretical advantage is a product which contains two fertilizer elements, thus the nitric acid should pay its way, saving the expenditure for sulfuric acid. However, the processes devised are comparatively involved, and they are of interest primarily to producers of synthetic nitrogen.

When phosphate rock is treated with hydrochloric acid, calcium monophosphate and calcium chloride are produced in solution. If lime is added to this solution calcium phosphate is precipitated and may be filtered off. When dried, a product containing 30 per cent. to 40 per cent. dicalcium phosphoric acid is obtained. None of this phosphate is water-soluble.

The Myles Salt Company in Louisiana has produced this material, using byproduct hydrochloric acid from their Hargraves salt cake furnaces. The Tennessee Corporation recently announced that they planned to build a plant at Tampa, Florida, capable of producing in the neighborhood of 50,000 tons of salt cake and 60,000 to 65,000 tons of dicalcium phosphate annually. This building program, however, has now been postponed.

Development of Triple Superphosphate

Early English patents (1865-70-75) covered the production of phosphorus by blast furnace blower methods, mixing fuel with calcium phosphate, silica and a soda salt. From these has stemmed the long and significant development of triple superphosphate which is discussed in another chapter by Dr. Carothers.

Many attempts have been made to produce fertilizer phosphate direct from rock by calcining or heating it. Usually the calcination is made in the presence of various alkali metal salts such as sodium sulfate, sodium carbonate or the corresponding potash salts, in rotary kilns at about 1400°C. Years ago an attempt was made to commercialize the Newberry Process—the calcination of phosphate rock in the presence of sodium sulfate or sodium bisulfate (niter cake) in a short rotary cement kiln. Results were variable and the attempt was abandoned. Later attempts failed. Recently a similar process has been successfully practiced in Germany. Rhenania phosphate is produced by calcining rock in the presence of a considerable excess of sodium sulfate.

Government chemists (Reynolds, Jacob, and Roder) have shown that in carefully controlled laboratory experiments fluorine can be practically completely driven from phosphate rock by heating ground rock containing silica to 1400°C. in the presence of water vapor for a sufficient length of time. The product so made is better than 90 per cent. available. It has long been known that in the presence of water vapor calcium fluoride can be decomposed at high temperatures into lime and hydrofluoric acid.

These calcination and fusion products offer distinct possibilities. Produced at the mines and containing practically as much available phosphoric acid as crude rock, they could be shipped directly to point of consumption. There would be no phosphoric acid reversion in the soil. Mechanically they are crystalline rather than amorphous, as is superphosphate, and should distribute better through the soil. Their calcium content, largely freed from fluorine, should be available.

Much has been heard of late about the rôle played by so-called minor elements in fertilizers. The need for such elements has often been discovered by accident.

Manure had been used for the growing of tomatoes in the calcareous soils near Miami, Florida. When it could no longer be had, the tomato crop suffered. Investigation disclosed that the manure contained traces of manganese. As little as fifty pounds of manganese sulfate to the acre is sufficient to restore fertility. In the Everglades it was noticed that other crops grew much

better where Bordeaux Mixture containing copper sulfate had been used on potato vines. This salt is now being added to Everglade fertilizers. In Holland copper sulfate is being applied to lands recently reclaimed from the Zuyder Zee. Traces of borax prevent heart rot in sugar beets, cauliflower and celery. Zinc salts prevent disease in citrus and nut trees. Certain plants do not develop in the absence of fluorine, but as this element is present in superphosphates no deficiency has yet been recognized.

Most nitrogen carriers leave acid residues in the soil. These may adversely affect crop production in soils low in lime content. They also tend to increase calcium losses abnormally. It is now common practice to add the proper amount of limestone or dolomite to fertilizer mixtures to neutralize these acids. Dolomite is preferred as it causes less reversion of phosphoric acid.

It has been the custom in preparing fertilizers for special crops to provide nitrogen in several forms—nitrate nitrogen, ammonium salts, and organic nitrogen—the thought being that each form functions during a part of the growing season and that better quality crops could be grown. It has now been pretty well demonstrated that in most instances, if nitrogen carriers containing acid residues—and this includes most organic forms as well as ammonia and urea—are properly neutralized there is no difference in the agronomic effect of the various forms of nitrogen. Nitrate of soda and cyanamid leave alkaline residues. All this discloses clearly the need for maintaining an ample supply of lime in the soil.

Unusual yields of vegetables have been secured at Berkeley, California, and at other places in tanks, by the use of extremely dilute aqueous solutions of soluble plant foods. The seed is placed in excelsior or other inert material, suspended on a wire screen over the nutrient solutions, into which the feeding roots drop. In some instances the solutions are recirculated to aerate them. Yields of potatoes in excess of 2500 bushels to the acre are reported, and tomato vines with Jack and the Bean Stalk proclivities are producing similarly high yields. The quality of the vegetables is reported to be exceptionally good.

Since 1918 the fertilizer industry has been confronted with many serious problems, in common with its chief customer the farmer. Its inventory and bad debt losses were excessive in the liquidation following the World War. It suffered severely during the early depression years. It was only with the rise in farm income beginning in 1933, that the industry staged sustained recovery. Better methods of distribution, a more efficient manufacturing technique, the sales promotional and fair trade practices of the National Fertilizer Association, have all contributed to the improvement. Notwithstanding increased labor and supply costs and higher taxes, prices were advanced only 6% during the five year period September 1932-37, whereas commodities advanced 21% and farm prices 79%.

Annual Fertilizer Consumption

(Short Tons)

1910–1914 average	6,135,854
1915–1919 average	5,892,544
1920–1924 average	6,195,363
1925–1929 average	7,514,149
1930	8,163,000
1931	6,306,000
1932	4,336,000
1933	4,870,000
1934	5,546,000
1935	6,218,000
1936	6,816,000
1937	8,200,000*

* preliminary

(Source: The National Fertilizer Association)

Industry's Bookshelf

Copies of these, or any other books published, will be supplied postpaid on receipt of price, or shipped C.O.D., plus postage, where remittance does not accompany order.

Book Department **Box 1405**
CHEMICAL INDUSTRIES **New Haven, Conn.**

The Economics of the Sulfuric Acid Industry by Theodore J. Kreps, Stanford Univ. Press, 284 pp., $5.00. A splendidly organized, well thought out, clearly written book which should be "required reading" for every man in the chemical industry. Dr. Kreps has made a notable contribution to the too scanty literature of chemical economics, the history of the production, use, and marketing of this important material in the main soundly interpreted and very well documented.

The Metallurgist's Manual by T. G. Bamford and H. Harris, Chapman & Hall, London, 257 pp., 7s, 6d. A cheap edition with a supplement of recently published handbook covering analysis and assay. A feature is the tables which concisely present much valuable data.

Chemical Analysis of Metals and Alloys by Edwin Gregory and Walter W. Stevenson, Chemical Publishing Co., N. Y., 375 pp., $6.00. Two recognized British authorities combine to produce an extremely valuable handbook of chemical analysis for the metallurgist.

A Hundred Years of Chemistry by Alexander Findlay, Macmillan, N. Y., 352 pp., $3.50. The conscientious scholarship and delightful style, which are combined by this well known chemical author, make this newest history of the development of chemistry a book that is at once important and interesting.

German for Chemists by John H. Yoe and Alfred Burger, Prentice-Hall, N. Y., 537 pp., $4.50. Part one consists largely of sentences of definitions in English and German; followed by sections on organic and inorganic chemistry, analytical and physical chemistry, colloid and industrial chemistry, a fine and complete series of reading excerpts from standard German text and magazine articles, so that the reading exercises are themselves a sound chemical training, an outstandingly helpful book of its kind.



VANILLIN MONSANTO

The standard of America

When you use Vanillin Monsanto, you build on a sound foundation of *known quality*, backed by experienced service and a dependable supply.

VANILLIN MONSANTO

Standard of America in Purity, Whiteness, Full Flavoring Strength, True Aroma, Uniformity, Freedom from By-Odors, Reliable Source of Supply, Convenient Packing, Low Cost.

Other Products include:

COUMARIN MONSANTO, METHYL SALICYLATE
MONSANTO (Oil of Wintergreen Synthetic)

Manufactured by

Monsanto Chemical Company

ST. LOUIS, U.S.A.

NEW YORK • CHICAGO • BOSTON • BIRMINGHAM • CHARLOTTE
DETROIT • SAN FRANCISCO • LOS ANGELES • MONTREAL



BOTANICAL RAW MATERIALS

for

Any Technical or Industrial Use



Consumers of botanical raw materials for technical and industrial uses have long turned to Penick, logically, as a chief source of supply. As the world's largest botanical drug house, Penick offers definite quality, price, and delivery advantages through:

- *Large* stocks at all times
- *Centrally* located plants
- *Wide* physical resources and equipment
- *Extensive* milling facilities for producing any fineness desired
- *Prompt* shipment
- *Lowest* market prices

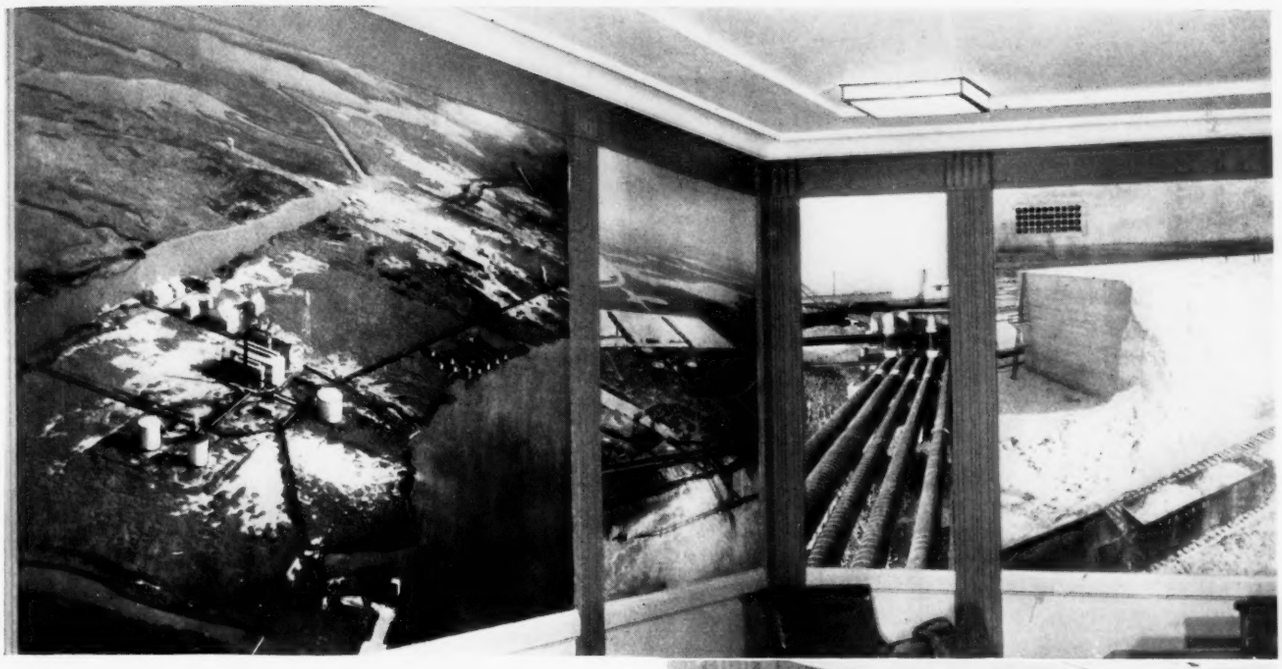
ACACIA GUM (Gum Arabic)
AGAR AGAR (Japanese Gelatin)
ALTHEA ROOT
ARGOLS, POWDERED
BALSAMS, OREGON AND CANADA
BIRCH BARK
BURGUNDY PITCH, IMPORTED
CATECHU GUM (Cut)
COCHINEAL
DRAGON'S BLOOD
GHATTY GUM
GUAIAC GUM
IRISH MOSS
ISINGLASS
KARAYA GUM (Indian Gum)
LOCUST BEAN POWDER
LYCOPODIUM
MASTIC GUM
ORRIS ROOT
PAPAIN (Vegetable Enzyme)
ROSIN POWDER
SANDARAC GUM
SAPONINE
SOAP BARK (Quillaya)
SOAP POWDER (Castile and Neutral)
TAHLA GUM
TRAGACANTH GUM (all grades)
VENICE TURPENTINE

All qualities under laboratory control

S. B. PENICK & COMPANY

132 NASSAU STREET, NEW YORK **1228 W. KINZIE STREET, CHICAGO**

THE WORLD'S LARGEST BOTANICAL DRUG HOUSE





One of the most effective and artistic uses of "blown-up" photographs of a company's producing activities is that effectively used in the board room of the Freeport Sulphur Company in their offices in New York City. These stunning photographs are a visual record of the modern application of the famous Frasch process, taken by the well known industrial photographer, Robert Yarnall Richie.







Golf at Skytop June 2-3 1938





At the meeting of the Manufacturing Chemists' Association and the Synthetic Organic Chemical Manufacturers Association, the golf tournament, under the auspices of the latter organization, has come to be the blue ribbon event of the chemical fraternity. The photographs on this page, taken by Albert A. Teeter (Chas. Pfizer & Co.), show, in the upper corner, president of the Manufacturing Chemists' Association, E. M. Allen, surveying the field; top to bottom, crosswise, are Ralph E. Dorland, New York manager of Dow Chemical; Glenn L. Haskell, vice president of U. S. Industrial Alcohol; in the center, Harold Simpson of Mallinckrodt, and behind him the famous mourner's bench of the gallery at the famous waterhole, and August Kochs, president of Victor Chemical Works.

Chemical Leaders at the Skytop Meeting



J. W. McLaughlin (Carbide), treasurer of the M. C. A.

Edmond E. Lincoln and Elvin H. Killheffer (both of du Pont)



Howard Huston (Cyanamid) below





S. W. Jacobs (Electro Bleaching Gas)

Harry L. Derby (Cyanamid) below

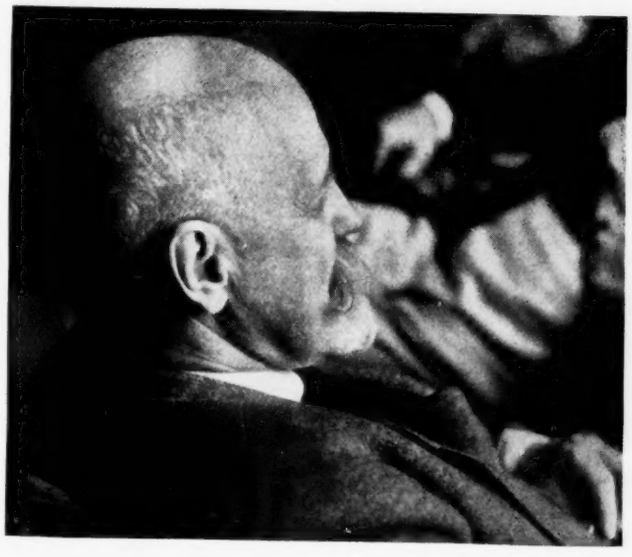


Ralph B. McKinney (Hercules Powder)



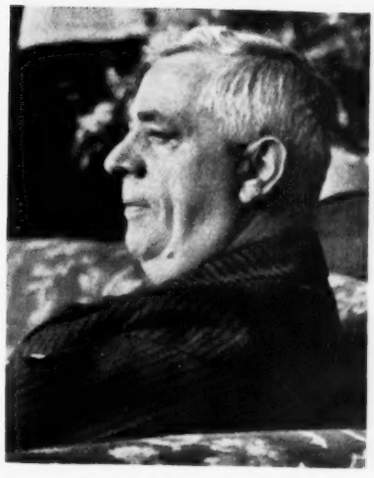


Sandford Brown (Bakelite Corp.)



William B. Bell (Cyanamid)

Theodore P. Walker (Commercial Solvents)

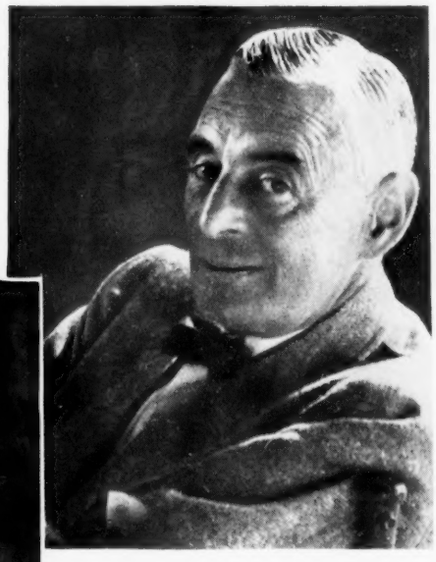




Good-fellowship Golf of the Chemists' Club (N.Y.)

Over the sporty Wingfoot golf course, the members of the Chemists' Club played, on June 9, a good-fellowship round, followed by a dinner, presentation of the prizes, and a good time by all. Photographs below were taken by Harold Fyffe.

William Callan, president



Howard Farkas (U.S. Stoneware)

E. E. Routh (Mathieson Alkali)







Left, Stanley Weil (Natural Products Refining) and right, George E. Taylor (Cyanamid)



The cameraman himself, Harold Fyffe (Oldbury Electro - Chemical)

BREAKING IN A CHEMICAL "BRONCO" . . .





Taming unruly chemicals . . . particularly in the field of phosphates . . . is a major function of Victor research. Outstanding is the success achieved by Victor's chemists in "breaking-to-the-bit" unstable, difficult-to-handle crystalline di-sodium phosphate . . . a product widely used in the textile industry and in the treatment of boiler feed water.

During storage, crystalline di-sodium phosphate rapidly loses much of its 60% of water of crystallization. Without a chemical analysis it is impossible to determine accurately the percent of active material present. Furthermore, crystalline di-sodium phosphate has a low melting point and readily cakes . . . so much so that it frequently has to be broken up with an axe or chisel before using.

Both difficulties were eliminated when Victor research developed an anhydrous di-sodium phosphate that neither cakes nor changes weight in storage. 40% less "bulky" than the crystalline product, it offers the added advantage of a material saving in freight and storage space required.

Solving product problems . . . developing phosphates to meet special requirements . . . creating new uses for phosphates is work we have happily been doing for over thirty years. Our research department will be glad to tackle one of your problems . . . to see if a "tailor-made" phosphate will do a job for you.

VICTOR CHEMICAL WORKS

141 W. Jackson Blvd., Chicago, Ill.

Plants: Nashville, Tennessee; Mt. Pleasant, Tennessee; Chicago Heights, Illinois

Offices: New York, N. Y.; Nashville, Tennessee; Kansas City, Missouri; Greensboro, North Carolina

FAMOUS FOR PHOSPHATES

VICTOR

HEADQUARTERS FOR PHOSPHORUS . . . PHOSPHORIC ACID . . .
AND PHOSPHATES OF ALL KINDS

STANDARDIZING ON DIAMOND BRAND IS YOUR ASSURANCE OF UNVARYING RESULTS IN YOUR OWN PROCESSES



58% SODA ASH

Consistently preferred throughout industry in the manufacture of glass, paper, textiles, detergents, enamel ware, etc. . . . Unvarying in composition, purity and full strength.

76% CAUSTIC SODA

Diamond 76% Caustic Soda is the standard of commercial quality,—it is used extensively in the manufacture of cotton, rayon, soap, oil refining, chemicals, rubber reclaiming, etc.

BICARBONATE OF SODA

The quality of Diamond Bicarbonate of Soda exceeds the United States Pharmacopoeia standard,—indispensable in the manufacture of self rising flours, medicines, lumber-dip, fire extinguishers, leather, etc.

LIQUID CHLORINE

Uniform purity combined with utmost safety in handling, nationally available in cylinders of 100 and 150 pound capacities. Also 15 ton multiple tank cars and standard 15 and 30 ton tank cars.

DIAMOND SODA CRYSTALS

A scientific aid to modern cleaning,—these light, fluffy, free-flowing crystals contain an ideal balance for safe and efficient cleaning. Dissolve instantly in hot or cold water—do not cake in the barrel.

CARBON TETRACHLORIDE

A non-inflammable, powerful solvent with remarkable properties and wide application. Its exceptional purity makes it especially desirable for dry cleaning purposes, oil extraction, leather cleaning, etc.

SPECIAL ALKALI

Diamond Special Alkalies are scientifically compounded to meet special cleaning requirements,—used in large quantities by brewers, beverage manufacturers, dairy plants, laundries, etc.

CLEANER AND CLEANSER

A combination of a detergent, cleaner and disinfectant. Made especially for large scale cleaning operations such as hotels, restaurants, office buildings, dairies, bakeries, packing establishments, etc

HI-TEST ALKALI

An exceptionally efficient and economical bottle-washing alkali made in flake form . . . eliminating dust. Assures long lasting solutions and thoroughly clean, sparkling bottles.

DIAMOND *Quality* ALKALIES

DIAMOND ALKALI

DIAMOND ALKALI COMPANY

PITTSBURGH, PA. *and* EVERYWHERE

Plant Operation and Management

A digest of new methods and plant equipment

New Developments in Water Treatment

By G. Leighton-Holmes and H. W. D. Stevens

PRELIMINARY details of new types of both acid and base-exchange materials of organic composition resembling the synthetic resins were revealed in a paper published in 1936, and a survey of the newer patents indicates that other workers have been developing along similar lines.

Further investigations led to the conclusion that sulfited quebracho resins possessed the best qualities for base exchange purposes. A material to act as a cation remover must be both acidic and insoluble to be practicable. There are two acidic groupings in a sulfited quebracho "molecule," hydroxyl and sulfonic acid. It was logical that, as the sulfonic acid grouping is added by means of the sulfiting process, the result of varying amount of sulfite dose should be explored. The results definitely proved that increased sulfiting yields higher capacity materials. However, with a large sulfite dose the resulting resins were too soft to be of value and threw color rather badly, so that a balance must be struck between capacity and stability.

Anion Removing Materials

The properties of a typical basic resin may be summarized as follows:

(1) Its capacity for absorbing acids increases with the strength of acid.
(2) This capacity is greater for sulfuric than for hydrochloric acid.
(3) The capacity for weak acids such as acetic is only small.
(4) It is regenerated by alkaline solutions such as caustic soda, sodium carbonate and bicarbonate and ammonia.
(5) The efficiency of regenerating alkali solutions increases with the strength of the acids which have been adsorbed.

It is of interest to note the properties of two materials now commercially available which possess these properties. The first, Permutit H. I., is carbonaceous in character, regenerated by acid, and has the important advantage that, not containing any silica, it cannot add silica to the effluent water.

There are three main uses for such an acid regenerating base exchanger. The first is by utilizing the acidity of an effluent water, passed through such a material, to neutralize the alkalinity of further quantities of the crude water or of the same supply softened by means of salt regenerated base exchange materials. As an example: London supply water has the following approximate composition, all in p.p. 100,000 as calcium carbonate: Total hardness 27, alkalinity 21. chlorine 3.0, and sulfur dioxide 4.0. After passing through Permutit H.I., this water contains no cations but three equivalent parts of hydrochloric acid and four of sulfuric acid per 100,000. The alkalinity of the raw water is 21 and, therefore, if three parts of the acid effluent are blended with one part of the softened raw water, the alkalinity of the latter is neutralized so that the resultant water is of zero hardness and zero alkalinity, containing 3.5 p.p. 100,000 of sodium chloride and 5.7 of sodium sulfate. In general, a certain excess of the softened water is employed, leaving about 1 p.p. 100,000 of alkalinity as a safety factor say for boiler feed or a little more for laundries. Whatever method is adopted the water contains carbon dioxide from the bicarbonate originally present, and by means of spraying, etc., this concentration is readily lowered to about 1.7 p.p. 100,000.

The importance of this type of treatment lies in the absence of the sludge which would be given by lime soda softening, and a water of zero hardness. Such a water for process work may not even need the removal of the carbon dioxide while for low pressure boiler-feed some conditioning can be readily applied and for higher pressures degassing will remove the residual carbon dioxide and the oxygen present.

This new type of treatment is extremely useful with waters containing sodium bicarbonate; up to now the only two types of treatment have been possible treatment; (1) with lime and calcium chloride or sulfate and; (2) with direct sulfuric acid dosing. In both cases the total solids are increased somewhat more for calcium sulfate than chloride treatment. Using Permutit H.I. and blending with crude water if the hardness is low enough, or with a softened supply if the hardness is too high, the total solids can be reduced in a proportion equal to the decrease in alkalinity of the water.

Permutit H.I. performs the first of the two operations necessary in removing soluble salts. There is also Permutit D.W. which will remove the acids formed in the first step, and possibly the best method to describe its properties is to give an average run as obtained in a 12-in. diameter plant operating on a water of the following composition:

Total hardness	31°
Alkalinity	25°
Chlorine	3°
Sulfur trioxide	4°

The plant treats 500 gal. between regenerations and an average sample of the first 150 gal. and samples taken at 250 gal. and 500 gal. had the following compositions:

	150	*250*	*500*
Total solids other than silica	0.97	0.73	0.70
Hardness	0.15	0.1	0.2
Alkalinity	0.77	0.45	0.05
Sodium chloride	0.16	0.10	0.35
Sodium sulfate	0.20	0.07	0.10

An interesting development in the lime soda method is the hot type lime soda process using temperatures in the settling tank of slightly over 212° F The settling tank is of the enclosed type with a dished head and a conical bottom. The diameter is designed so that the velocity of the downward flowing treated water will be low enough at all times to permit very complete settling. Chemicals required for treating the water are delivered by means of a pump from a ground operated chemical feeder, and they are introduced into the softener just below the heater.

Here the accurately measured dosages of chemicals come in contact with the hot water flowing from the heater, and are thoroughly mixed with the water. At the high temperatures

Abstract of lecture delivered before Hull Chemical & Engineering Society, published in *The Industrial Chemist*, May, '38, p. 191.

employed, the chemicals react very speedily with the hard water, softening it and forming coarse, heavy precipitates of calcium carbonate and magnesium hydroxide.

As the treated water slowly flows downward through the settling tank, these precipitates fall, growing larger as they descend, until the lower edge of the uptake is reached, at which point the flow of water slowly turns upward, while the heavy precipitates continue to fall to a conical bottom. While the settling tank may be heavily insulated, some cooling occurs, and it is well known that even very slight differences in temperature affect the density of the water sufficiently to cause convection currents, which interfere with complete settling.

In the Permutit design, the hottest water, which is the lightest, is always at the top, while the slightly cooler and therefore denser water is beneath it, and any cooling effect which occurs, causes currents in the direction of the flow and not against it. Since the water, while settling, moves with and not against the current, there is no tendency for the precipitates to be carried upward.

By the time the water has reached the open bottom of the uptake and reversed its direction of flow, the settling has been completed, and, since the circumference of the bottom of the uptake is large, the velocity of the water, as it begins to rise through the uptake, is so low that no lifting tendency is exerted on the sludge. The conical uptake is surrounded by an insulating wall of hot water so that sudden temperature changes in the uptake cannot take place.

The size of the standard settling tank is made sufficient to provide one hour's detention, excluding the top head and the sludge cone. This is more than sufficient time to complete the chemical reactions and effect satisfactory settling. The capacity of a hot lime soda plant is determined by the flow rate of hot water leaving the heater. Because of the steam condensed in the heater, this is usually about 10 per cent. higher than the flow rate of cold water entering the heater. The amount of steam condensed depends upon the temperature of the cold water influent.

The standard settling tank is built for a steam pressure of 10 lb. per sq. in. for plants up to 40,000 gal. per hour capacity and for 5 lb. per sq. in. above that capacity.

Industrial Wastes as Liabilities

By F. W. Mohlman

Editor, Sewage Works Journal

In the brewing industry, spent grains are generally recovered by dewatering in expellers, and steam drying. The expeller discharges a highly concentrated and putrescible liquor which adds considerably to the population equivalent of the wastes. Likewise, waste yeast and wort residues add to the organic load. A concerted study of improved methods of recovery would show results.

Yeast, vinegar and distillery wastes are a big problem. The question of concentration of solids in the wastes now seems to be the dividing line between profitable and unprofitable recovery—but this question is the crux of all industrial waste problems. The fermentation industry is making a commendable effort to find out how much can be recovered within the factory. Jensen, in Denmark, has developed processes of treatment of these wastes, and Standard Brands in this country has been carrying on intensive research for several years on the treatment of yeast wastes. Commercial Solvents Corporation has also studied the problem, and the Hiram Walker plant has installed and is operating equipment which is claimed to recover practically all of the organic solids. Other distilleries are making some effort toward a study of the problem.

The great meat packing industry produces probably the largest volume of the most putrescible waste in American industry, and for decades this waste has defiled streams and overloaded sewage treatment works, yet there has been no concerted effort to study the problem. Individual packers have made laboratory studies, but the industry's research center, the American Institute of Meat Packers, has done nothing. The once-vaunted boast that everything was recovered but the squeal, never was true; the sewers carried away the evidence of other losses.

Tanneries recover hair, but little effort has been made to recover lime, chrome salts or fertilizer. The Tanners' Council tackled the problem years ago, but not much has been heard from them recently. Treatment of tannery wastes has been studied at length, but little effort has been made to conserve waste substances within the tannery.

Paper mills have made great progress in recovery of fiber, but the basic sulfite and sulfate processes still discharge a large proportion of the weight of the wood as wastes. These wastes have probably been studied more than any other industrial waste, and hundreds of patents for recovery of materials have been granted, but as yet no satisfactory process has been developed. Sulfite waste is still a challenge to the most skilful efforts of research chemists. However, the Howard process has shown promise. For fiber losses, the Adka process seems to be exciting attention. After all has been done that can be done within the paper factory, there will still remain waste waters that may require further treatment.

Other organic wastes, from canneries, wineries, and beet sugar works, are widespread and the losses are staggering, but in this field there are so many small plants that attention should first be directed to the larger ones.

The steel and chemical industries are of less importance as producers of industrial wastes, if we except the by-products coke plants. In steel works, pickling liquor is practically the only waste of importance. This has long been a subject of concern and research, and everyone agrees that the ferrous sulfate should be recovered, but it has been hoped that better technique might be developed in the recovery process, to cut down costs and improve the product. A great advance has been reported in Germany in methods of recovery, and a comprehensive symposium, held at the meeting of the Association of German Steel Workers in Düsseldorf last year, indicated that several improved processes for recovery of copperas and ferrous sulfate (monohydrate) are being used in Germany.

Phenol wastes from by-products coke plants are probably most widely publicized and condemned of any industrial wastes because of their effect on the taste of public water supplies. The progress that has been made in the extraction of phenols from these wastes is well-known, and processes are available that will remove 90 per cent. of the phenols from such wastes. It is not generally realized, however, that only about 70 per cent. of the B.O.D. is removed by such processes, leaving a substantial residual waste that will affect the oxygen balance of streams and the loading of sewage treatment plants.

Chemical wastes are of infinite variety, but on the whole they are of less serious significance than those just discussed. Large tonnages of acids can be discharged into sewers or streams, if care be taken to balance the acidity against the available alkalinity of the sewage or water, and uniform discharge of acid be provided. Precipitation, aeration or evaporation within the plant may result in substantial reduction of wastes.

In this brief review, it is apparent that such wastes are almost universally liabilities to the sewer authority, but they may not be liabilities to the manufacturer. After entrance into the sewer, hope of profitable recovery practically vanishes. Therefore, industry should exhaust every possibility of recovery within the factory by establishment of research groups of chemists and engineers charged with the responsibility of determining what improvements of processes and recoveries of materials may be accomplished.

Reprinted from *Sewage Works Journal*, Jan., '38.

REDUCE CORROSION LOSSES WITH KEMPRUF TRADE MARK CARBON PRODUCTS



"KEMPRUF" CARBON RASCHIG RINGS

The ideal tower packing for processes requiring materials resistant to corrosion and thermal shock. Light weight. Free from spalling. Exceptionally long life.

"KEMPRUF" CARBON BRICK, TILE and SPECIAL SHAPES

Highly adaptable materials of construction for all types of chemical proof masonry and corrosion resistant linings.

"KEMPRUF" CARBON GROUND RODS

For cathodic protection or electric drainage of pipe lines, protection against leakage currents or ground connections in corrosive soil.

Carbon is a Corrosion Resistant Material of Construction which is being applied to many and widely varied uses in the chemical process, oil, gas and other industries.

- It is highly resistant to the action of acids, alkalies and solvents.
- It resists oxidation in air up to 650° to 750° F.
- It is mechanically strong and possesses good electrical conductivity.
- It has high thermal conductivity coupled with low coefficient of thermal expansion.
- It is highly resistant to thermal shock.

LET US HELP YOU REDUCE CORROSION LOSSES WITH "KEMPRUF" CARBON PRODUCTS

Mail coupon TODAY

NATIONAL CARBON COMPANY, INC.

Unit of Union Carbide UCC and Carbon Corporation

Carbon Sales Division, Cleveland, Ohio

General Offices: 30 East 42nd St., New York, N. Y.

Branch Sales Offices: New York Pittsburgh Chicago San Francisco

National Carbon Company, Inc.
P. O. Box 6087, Cleveland, Ohio.

Date _____ 193____

Gentlemen: Please send us information on the use of "KEMPRUF" Carbon Products in connection with the following application:

_____

_____

IF YOU DESIRE REPRESENTATIVE TO CALL, PLEASE CHECK HERE ☐

Name _____

Firm _____

City _____ State _____

CI-1-38

Casting Sulfur Pipe

By Isaac Bencowitz

Texas Gulf Sulphur Company, Inc.

Sulfur has been used for many years as a jointing and sealing compound in constructing floors, sewers, acid tanks, etc., because of its inertness towards water, certain electrolytes and acids. A recent development involves its application in the fabrication of pipe or lining of steel pipes.

The technique is similar to that used in the production of centrifugally cast iron pipe; the apparatus consisting of a rotating jacketed mold and a feeding mechanism. The mold is started cold and as it revolves at approximately 1000 r.p.m., a small quantity of molten sulfur is fed into it; this cools and sets and forms a skin on the mold. This skin is coated with fine coke and the combination facilitates the subsequent removal of the finished pipe.

After the preliminary skin of sulfur has been formed a given quantity of coarse aggregate, followed immediately by a predetermined quantity of molten sulfur, mixed with aggregate is charged to the mold. The mold is rotated until the material is well compacted and until the formation of the pipe is complete. The mold is then stopped and heated with steam. The preliminary skin of sulfur cast in the mold melts and allows the easy withdrawal of the finished pipe.

The compositions and characteristics of various sulfur pipes are given in the Table:

Weight per lineal foot	Composition by Weight Per Cent.					Strength Hydraulic Pressure lbs./sq. in.	Tensile Strength lbs./sq. in.	Density
	Sulfur	Sand	Coke	Gravel	Asbestos			
34	83	..	..	..	17	95	152	1.77
35	66	16	7	..	11	85	136	1.87
35	57	23	11	..	9	65	104	1.87
38	35	..	..	60	5	75	120	2.23

The same principle may also be applied to the lining of steel pipe. A rather simple method of lining steel pipe consists in first coating the interior of the pipe with a bituminous material. A steam heated core of the proper size is centered in the pipe and a mixture consisting of molten sulfur and aggregate is poured into the annular space. After the mixture has solidified, the core is removed, leaving a pipe with a homogeneous interior coating of sulfur.

Sulfur pipes are unaffected by changes in temperature, and are resistant to many corrosive liquids. Pipes made of sulfur combined with an aggregate have been exposed to extremely corrosive "bleed water," containing salt, sulfides, sulfates, etc., for more than two years without signs of deterioration. Sulfur lined steel pipe has been used for the conveyance of salt brine and after three and one-half years of service are still in good condition. In such service steel pipes have been known to fail in four months.

Sulfur pipe can be made to withstand an internal pressure of 95 lbs./sq. in.; they have a crushing strength of 850 lbs./sq. in. The chemical inertness of sulfur and its insulating properties may prove of value in handling corrosive liquids encountered in industry.

Hydrogenation Fatty Acids

A catalyst for the hydrogenation of unsaturated fatty acids to alcohols contains copper and from 20-60 per cent. of cadmium monoxide calculated on the weight of the copper, but no other catalytic metal, deposited on a carrier such as kieselguhr, asbestos or pumice (E. P. 479,642, *Chemical Trade Journal*, May 20, '38, p. 433). The reduction of the catalyst may be effected after admixture with the acid at a hydrogen pressure below 30, *e.g.*, 10-20 atm., and at about 100-200° C., the mixture then being further heated to at least 280° C. at higher pressure. The reaction autoclave, suitably of V_4A steel, may be plated internally with a copper-cadmium layer, for example, by effecting several reductions therein. In examples, a solution of copper sulfate and cadmium nitrate is treated with sodium carbonate, the precipitate mixed with kieselguhr or animal or wood charcoal, washed, dried at 130° C., and reduced in presence of the acid.

Recovery of Scheelite

Scheelite (calcium tungstate) may be recovered by flotation using as reagents a mixture of oleic acid, ethylene chloride in a soda ash circuit. In a pilot plant, capacity 75 tons daily, at Mill City, Nevada, sulfides are first removed by flotation and the slime tailings of the sulfide flotation machine passed to the scheelite flotation section. A low grade concentrate assaying 10 per cent. WO_3 is here recovered and this is improved to 55-65 per cent. WO_3 on a Diester slime table. The gravity concentrate is roasted to remove sulfur before bagging. The tailing from the Diester table contains 3.0 per cent. WO_3 and is returned to the scheelite flotation cell. The tailing from this cell is scavenged in another cell to 0.02 to 0.09 per cent. WO_3 before being discarded. Extraction of scheelite from slime by flotation is as high as 91 per cent.—U. S. Bureau of Mines, R. I. 3,357, December, 1937.

Electrolytic Lead Lining and Coating

Electro-deposition of lead for direct production of lead-lined and lead-coated chemical equipment has been recently put into practice in the U.S.S.R. (*Chemical Trade Journal*, May 27, '38, p.442). The electrolyte consists of the lead salt of phenol sulfonic acid (90 grams per litre), free phenol sulfonic acid, 40 to 50 grams per litre, and ordinary glue, 1.5 grams per litre. The current density employed in usual practice is about 0.6 amperes per square dm., and enables the production of a coating 1 mm. thick. For treating iron piping to be employed in direct contact with hot sulfuric acid, a somewhat different procedure is followed. The pipes are first pickled in a solution containing, per 100 litres of water, sodium chloride (13 kilogs.), concentrated sulfuric acid (7.5 lb.), and concentrated hydrochloric acid (2.5 lb.). After washing, the material is then subjected to the electro-deposition process, the current density in this case being 1.2 amperes per square dm. and compressed air being passed through the electrolyte during the operation. For the lead-lining of piping, the lead anode is inserted inside the pipe, which itself serves as the cathode, the current density used in this case being 0.25 amperes per square dm.

Symmetrical Dichlordimethylether

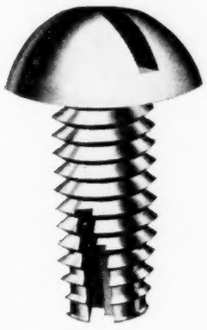
New method for preparation of symmetrical dichlordimethylether ($ClH_2C.O.CH_2Cl$) is described by Dr. Hans Schneider, in *Angewandte Chemie*, May 13. The method, which is stated to result in high yields of a pure product, is given as follows:

Paraformaldehyde is stirred into about six times its weight of concentrated sulfuric acid, and into this mixture is passed hydrochloric acid gas with stirring and cooling until the mass is saturated. The absorption is said to be almost as rapid as in the case of water. The dichlordimethylether separates as a thin, clear layer which can readily be separated. Product has a boiling point of 105° and the yield is about 85 per cent. An alternative method is to decompose the mixture of paraformaldehyde and concentrated sulfuric acid by the gradual addition of the calculated quantity of ammonium chloride while stirring and cooling. In this case the yield is about 70 per cent. If the temperature is allowed to rise too high, or the reaction is conducted too quickly, some methylene dichloride, recognizable by its slightly sweet smell, is formed. The method for the production for the dichlordimethylether described in the literature is by the action of hydrochloric acid gas on aqueous formaldehyde solution, and is said to be both lengthy and resultant in poor yields. (*Chemical Trade Journal*, May 20, '38, p.420).

New Equipment

Thread-cutting Screws for Plastics

A Shakeproof "Hi-Hook" Thread-cutting Screw, expressly developed for plastic materials, is a specially designed double width slot giving an acute cutting edge that cuts a clean, sharp thread in all types of plastic compositions, both molded and laminated. This construction materially reduces the high driving torque normally encountered and enables fast, easy driving with a minimum of the breakage common to molded plastics. Because the screw cuts a standard thread, it may be replaced if necessary by a conventional machine of the same size without damaging the tapped hole. The need for a separate tapping operation or threaded inserts is eliminated, the only requirement being that the screw be inserted in a molded or drilled hole of the proper size and driven home with a hand or power driver. A free demonstration kit of thread-cutting screws, including an assortment of different sizes and complete instructions for testing, can be had by writing Shakeproof Lock Washer Co., 2501 No. Keeler ave., Chicago.



Running Time Meter

The Cramer Running Time Meter (summation) which automatically registers the operating time of the circuit, apparatus or system to which it is connected, is a new item manufactured by R. W. Cramer Co., 67 Irving Pl., N. Y. C. Driven by a slow speed, self starting synchronous motor, it is made in two types—one for registering total hours, and one for registering total minutes. A five dial counter is used and indicates in tenths up to 9999.9 and repeats. The dial registering in tenths is useful for measuring short time intervals, and also for verifying the operation of the circuit. The meter is connected in parallel with the machine or apparatus of which the total operating time is to be registered; the synchronous motor starts and runs continuously while the machine or device is operating. It has a very wide range of applications, *e.g.*, to record the actual operating time of processing and production machines, X-ray and diathermy apparatus, radio transmitters, textile and paper machinery, blowers, welders, etc., and also for time study.

Tubing for Oils and Solvents

Completion of facilities at their Dover, N. J., plant, for the manufacture of Resistoflex PVA tubing in diameters up to and including ½" I. D., is announced by Resistoflex Corp., 370 Lexington ave., N. Y. C. Resistoflex is the trade mark and trade name used in American production of a flexible synthetic resin—basically, polyvinyl alcohol—which is inert to gasoline, oils and organic solvents; which retains its flexibility throughout a wide temperature range, and which has been manufactured during the past several years by foreign corporations, with which Company is indirectly affiliated. Tubing is being used successfully abroad in many industrial applications: chiefly in the fuel and brake lines and lubrication systems of automotive equipment, Diesel engines and aircraft; in the conveying of solvents and mineral and vegetable oils in the chemical and process industries; in hydraulic lines; and in fuel and oil handling equipment. At present it is offered in the form of tubing in standard sizes, although "Resistoflex" gaskets, washers, packing, diaphragms and sheet material are scheduled for later production.

Larger-size Foam-making Water Nozzle

An important development in modern fire-fighting methods has been made possible by Pyrene Mfg. Co., Newark, N. J., who have just announced production of a larger capacity Phomaire Play Pipe, Model PP24, that makes 500 to 750 gals. of fire-smothering foam per minute and produces 350 gals. of foam from only one gal. of Phomaide solution. Operation is practically fool-proof, for there are no complicated preliminaries and no confusing adjustments. Water at 75 lbs. pressure or more may be pumped from suction, hydrant or water tank. Only 35 to 40 gals. are required per minute, making it practical wherever the water supply is limited or for use on booster tank or booster pump.

Glass Cloth Anode Bags

A new type of anode container—a glass cloth bag—is of one-piece, tubular construction, not sewed, but sealed by a special process at one end and protected from ravelling at the other end. It is flexible, not brittle, and will far outlast any cloth bag. The little extra care required in handling is not more than would be called for if it were made of strong parchment paper. Bag is recommended for all acid solutions and also for many alkaline solutions, and was developed by Hanson-Van Winkle-Munning Co., Matawan, N. J., in cooperation with Corning Glass Co.

New Type of Face Mask

For the protection of chemists using nitrometers, the Ipco Nitrometer-Acid Mask has been designed by Industrial Products Co., 765 W. Somerset st., Phila. Should the decomposing bulb burst, the user is shielded from fragments of glass and spraying acid. It may be used to advantage in many chemical operations requiring protection to eyes and face from acid splashes and when pouring or dipping from open vessels, carboys, drums, or pickling tanks. Mask weighs 14 ozs. and is made of sheet aluminum, formed to shape and channelled to allow for a clear cellulose acetate window which can be easily replaced without the aid of tools. Friction hinge joints permit wearer to raise mask over the head when not exposed to the hazard.



Improved Hammer Mills

Three new sizes of Pulverators (hammer mills) of improved design, to supplement their present line, are announced by Allis-Chalmers Co., Milwaukee. The pulverizing chambers are 24, 36 and 48 inch inside widths, and are designed to reduce the product of primary crushers handling moderately abrasive materials where small products with a maximum of fines are desirable. The pulverizing is by impact on involute liners. New machines are of welded steel plate construction, stress relieved, with wearing surfaces protected by rugged manganese steel liners held in place by lugs on the liners extending through the frame and held securely with keys and setscrews on the outside. This method of securing liners means that there are no bolt heads in the pulverizing chamber subject to wear.

Booklets & Catalogs

How to get these booklets: Companies will be glad to supply copies free, provided "Chemical Industries" is mentioned and the request is made on company stationery. Your business title should also be given.

Adsco Vertical Float Type Steam Trap, with or without thermostatic air by-pass, Bulletin No. 35-86, details of construction and installation hook ups. American District Steam Co., No. Tonawanda, N. Y.

Catalog No. 6, supplementing Catalog No. 5 (now out of print), spiral bound, listing and describing chemical, bacteriological, pharmaceutical, medical, engineering, electrical and general scientific and other technical books of all American and British publishers, will be mailed to any chemist, engineer, scientist or professor, sending 10c to cover mailing. Chemical Publishing Co., 148 Lafayette st., N. Y. City.

Chemical Topics, interesting house organ devoted to news of new developments in the industry and also of company's new products, published by Monsanto Chemical Co., Merrimac Division, Boston, Mass.

Chromium Chemicals as Corrosion Inhibitors, an instructive booklet on the subject of corrosion inhibitors which has not been widely written-up in the past; discusses in detail "Why and How Do Bichromates Protect Iron," and also reviews typical approved applications. Mutual Chemical Co. of America, 270 Madison ave., N. Y. City.

Coal and Ashes Handling. Catalog No. 1510, copiously illustrated, contains ideas and suggestions for cutting handling costs in the power plant by means of elevating and conveying equipment, coal crushers, etc. Link-Belt Co., 300 W. Pershing rd., Chicago, Ill.

Controlled Atmosphere Annealing Furnaces for Non-ferrous Metals. Bulletin No. SC-78, contains operating data and illustrations of installations, also types of furnace available. Surface Combustion Corporation, Toledo, O.

Corrosion Resistant Chemical Equipment. General Bulletin 0-1, describes composition of two regular grades of Haveg, molded construction material, their physical and chemical properties, design and applications in the process industries; separate bulletins on some of the more important classes of Haveg equipment available. Haveg Corp., Newark, Del.

Crushing Plant Machinery. Bulletin 1473-A, of special value to builders of new plants as it indicates types of machinery with particular applications to suit local conditions; describes latest types including many recent improvements. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Crushing Rolls. Bulletin 1815-D, illustrates and describes improved line. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Cyclone Metal Conveyor Belt. Folder and Catalog, 1938, covers construction, applications, features, and specifications; information blank enclosed for prospective users, from which belt problems are analyzed and prices quoted, at no extra cost. Cyclone Fence Co., Waukegan, Ill.

De-Ion Linestarters, non-reversing, for application where overall dimensions are not limited and where wiring room must be exceptionally large, leaflet. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Duriron-Kjeldahl Equipment for Digestions and Distillations. Bulletin 1202-A, features, applications, charts, illustrations, installations and types outlined. Duriron Co., Dayton, O.

Dyestuffs & Stainless are Friendly Enemies, booklet, on use of Armco Stainless Steels in textile equipment; general recommendations for various dye solutions are given. American Rolling Mill Co., Middletown, O.

Electromode Electric Unit Heaters, for commercial and industrial use, Bulletin No. 38-A, completely details construction, operation and application; specifications, drawings and other data also outlined. Electric Air Heater Co., Division of American Foundry Equipment Co., 555 So. Byrkit st., Mishawaka, Ind.

Falstrom Steel Panels, folder, on company's line of precisioned steel panels for control rooms, outstanding features, illustrations and specifications. Falstrom Co., Passaic, N. J.

Haynes Stellite—2400 Metal Cutting Tools, illustrated folder, on new high-production metal cutting alloy; available sizes and styles of standard 2400 square and rectangular tool bits and welded tip tools are given, together with prices and how tools are best used and what materials they will machine economically. Haynes Stellite Co., Kokomo, Ind.

Heat Transfer Equipment for Chemical Industry. Bulletin 1260, illustrates and concisely lists more than 20 designs; also includes convenient self-indexing reference table listing most suitable types for each special fluid and service. Griscom-Russell Co., 285 Madison ave., N. Y. City.

H-O-H Lighthouse. June, 1938, feature article "Fermentation Industry Waters," on the subject of effective treatment of water for use in the brewing and distilling industries. D. W. Haering & Co., 3408 Monroe st., Chicago, Ill

Horizontal Gas-fired Radiant Tube Heating Elements, as applied to every phase of heat treating, Bulletin No. SC-80, a brief story of this heating element, with illustrations of installations, and dimensional and operating data. Surface Combustion Corp., Toledo, O.

How to Fit Eye-protection Goggles to Workers for Greatest Comfort and Safety, pamphlet, divided into two parts; one section devoted to instructions on fitting eye-cup goggles, the other to spectacle type; lists range of sizes available for industrial eye-protection. American Optical Co., Southbridge, Mass.

How to Run a Lathe, new 34th edition, completely revised and material divided into chapters and sub-headings according to machining operations, beginning with the elementary work and progressing to the more advanced metal working jobs; contains latest and most authoritative information available on modern lathe practice. Besides the English, copies are available in French, Spanish, Portuguese, Swedish and Dutch, and will be mailed, postpaid, anywhere for 25c. South Bend Lathe Works, So. Bend, Ind.

Jeffrey Swing Hammer Shredders, Catalog 660, for serving many industries in reduction of materials; lists industries served, with illustrations of adaptations, dimensions, tables, specifications. Jeffrey Mfg. Co., Columbus, O.

Metavane System of Pneumatic Telemetering. Bulletin No. 513, gives information regarding use of this instrument, particularly in hazardous atmospheres, for recording and automatically controlling flow, temperature, pressure and liquid level at a distance from the source of measurement. Bristol Co., Waterbury, Conn.

P & H Convertible Slip Ring Motors. Bulletin M-2, thorough analysis of requirements demanded of standard wound rotor type of slip ring motor; specific information on design and salient features, cross-sectional line drawings; of interest to motor users in all industries where motors with controlled starting and speed regulation are required. Harnischfeger Corp., 4400 W. National ave., Milwaukee, Wis.

Packaging Machinery, folder, reviews new installations and notes items of interest to users and prospective users of packaging machinery. Stokes & Smith Co., 4910 Summerdale ave., Phila., Pa.

Polishes, leaflet contains announcement of new metal polish, lists polishes available for different applications. Fuld Bros., 702 S. Wolfe st., Balto., Md.

Process Industries Quarterly, Second Quarter, Vol. 3, No. 1, contains some very interesting applications and technical data on use of nickel-clad steel in the chemical process industries. International Nickel Co., 67 Wall st., N. Y. City.

Procedure Handbook of Arc Welding Design and Practice, Fifth Edition, includes all new data essential for most efficient use of arc welding in all its varied applications; encyclopedic in scope, concisely written and profusely illustrated. Copies mailed, postpaid, anywhere in U. S. for $1.50 per copy; foreign, $2.00. Lincoln Electric Co., Cleveland, O.

Refractory Products, Form DS Series 700, information on J-M line, including cements, castables and plastics; data on character or base of each, highest working temperature, number of pounds needed to set 1,000 bricks or form one cu. ft. of construction, and form in which product is furnished; comprehensive table lists various types of equipment used in different process industries. Johns-Manville, 22 E. 40th st., N. Y. City.

Rex Oil Well Chain Data Book, complete exposition for oil field men of the development, design and use of this type of chain; particularly interesting are sections relating to history of oil well chains and proper care on the drilling rig; specifications. Chain Belt Co., Milwaukee, Wis.

Roller Chain Data Book, No. 1757, on Silverlink roller chain and sprockets for drives and conveyor uses, 174 pages of practical information, application pictures, and engineering data, including many new chains and features not hitherto published; a valuable fund of information for anyone having occasion to select, order, use or maintain equipment of this character. Request should be made on business letterhead. Link-Belt Co., 519 No. Holmes ave., Indianapolis, Ind.

Rotex Screeners, leaflet, lists four new models; gives features, specifications and illustrations. Orville Simpson Co., 1230 Knowlton st., Cincinnati, O.

Sewage Sludge Dewaterers. Bulletin No. 240, for use in small, medium and large communities, installations listed and illustrated; equipment also for basic industries such as chemicals, petroleum, cement, paper, etc. Oliver United Filters, Inc., 33 W. 42nd st., N. Y. City.

Silverstat Regulators, for automatic voltage control of small a-c. and d-c. generators, Catalog Section 31-260, booklet develops application, construction and outstanding features, illustrated with photographs and charts. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Simpson Intensive Mixers. Bulletin, to acquaint users and prospective users with a better idea of the extent to which this type of equipment has been developed; illustrations, features, specifications and applications. National Engineering Co., Chicago.

Smootharc Welding Electrodes. Bulletin R-5, complete and specialized information and data, including spar tests, procedure sheets and many other informative suggestions which make it a valuable reference for all welder users and operators. Harnischfeger Corp., 4400 W. National ave., Milwaukee, Wis.

Spray Equipment, folder, announces new Dynaprecipitor Unit, said to be a radically new development which takes the place of the ordinary water wash chamber for spray booths; lists features. Binks Mfg. Co., 3114 Carroll ave., Chicago, Ill.

Stokes High Vacuum Pumps, catalog, comprehensive presentation of story of higher vacuum, applications, advantages and economies in industry; of value to anyone working with vacuum in its higher ranges, from around 28" up to within a few microns of absolute; complete handbook section. F. J. Stokes Machine Co., Olney P. O., Phila., Pa.

Super-duty Brick for Super-duty Service, folder, context points out factors which led to development of these refractories (Alamo and Varnon brands) in which definite properties have been developed to meet service conditions beyond the limits of high heat duty fireclay brick; contains information on their manufacture and applications. Harbison-Walker Refractories Co., Farmers Bank Bldg., Pittsburgh.

Swish, leaflet, describes new ready-mixed dry cleaner for walls. Fuld Bros., 702 S. Wolfe st., Balto., Md.

Symposium on Plastics, comprises six technical papers with considerable discussion, presented at A. S. T. M. Regional Meeting in Rochester in March; interesting information on tests used in other countries, a number of bibliographical references refer to previously published information from a wide number of sources. Copies may be obtained for 75c from American Society for Testing Materials, 260 S. Broad st., Phila., Pa.

Testing Apparatus, for cement, concrete, lime, gypsum and soils, Bulletin 221, devoted to apparatus conforming to standard specifications of the A. S. T. M. and Amer. Ass'n State Highway Officials; detailed information on U. S. Standard sieves and screens, also data on other types. Precision Scientific Co., 1736 N. Springfield ave., Chicago, Ill.

The Chemist Analyst, May, 1938, contains many useful laboratory suggestions; presents Part One of paper on Determination of Manganese in Iron Alloys, Ores, and Slags. J. T. Baker Chemical Co., Phillipsburg, N. J.

The Clean-Up, June, 1938, feature article, "Which Wax to Choose," on how to check different brands for resistance to moisture and other [illegible] ors. C. B. Dolge Co., Westport, Conn.

The Givaudanian, Industrial Aromatics Division, May, 1938, feature article "Reodorants for Synthetic Rubber." Givaudan-Delawanna, Inc., 80-5th ave., N. Y. City.

The Laboratory, Vol. 9, No. 5, several new, interesting laboratory items discussed. Fisher Scientific Co., Pittsburgh, Pa.

The Power Specialist, April-May, 1938, interesting and informative articles on "Mining Asbestos" and "Sulfur"; summaries of newer adaptations of company's products, and details of new plant being built at Jarratt, Va. Johns-Manville, 22 E. 40th st., N. Y. City.

Thiokol Facts, Vol. 1, No. 13, contains announcement of new Dow-Thiokol alliance; also information on latest adaptations of this synthetic rubber. Thiokol Corp., Trenton, N. J.

Trucks, Tractors and Cranes, booklet, clearly illustrates mechanical details of various machines in company's line; each illustration accompanied by concise set of specifications, including available power. Elwell-Parker Electric Co., Cleveland, O.

Type HD Heavy Duty Push Button Stations, leaflet, describes line available with a mushroom type of operating head for application in places where usual shrouding of button is not desirable. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

New Chemicals for Industry

A digest of products and processes

New Process Red Lead

By A. Brookes

RED lead powder, as manufactured by the ordinary methods, possesses two marked disadvantages: (1) Comparatively large particle size, resulting in low covering power, rapid settling rate and general difficulty in application; (2) Low chemical purity as regards Pb_3O_4 content, the pigment containing a high proportion of the monoxide litharge. This results in fairly rapid setting of the paint, due to the reaction between PbO and linseed oil, which results in a gel formation so that such paints must be used within a few days of mixing.

Developments in red lead manufacture with the above in view have resulted in a certain amount of success and led to the production of "non-setting" red leads which have resulted in mixed pastes and paints becoming a practical proposition.

Various methods have been proposed or used such as: (1) mechanical agitation of the molten lead during oxidization; (2) use of air and steam jets playing on or through the molten lead or directed against a thin molten lead stream; (3) use of mechanical grinding arrangements simultaneously with the heating; (4) by vaporization of lead in a high temperature furnace whence the volatilized metal is oxidized under controlled conditions; (5) by electrolytic processes or, (6) by treatment of fine grade lead carbonate.

Dr. R. Maier and his associates have succeeded in producing, on a commercial scale, a new red lead which possesses remarkable properties and it will be manufactured by a British concern, the Micro-Lead Products (Ericsson) Ltd. Supplies in large quantities will shortly be available.

The "Vaprolite" process consists in feeding molten pig lead from a controlled electric melting furnace at a constant rate into a main vaporizing furnace. The latter is of special design and is heated to a high temperature by a three-phase carbon arc between which, and on to the heated base of which, the molten lead drops to be explosively evaporated by the "Leidenfrost" effect, a similar effect to that given by dropping water on to a hot plate. The vaporized metal is passed into a large precipitation chamber where it comes into intimate contact with pure oxygen, and under controlled conditions of temperature, mechanical swirling, etc., is converted into red lead which is finally collected by worm conveyor and passed to the automatic weighing plant.

The pure oxygen is manufactured in a special plant by liquefaction from air.

Process can be arranged for production not only of pure red lead, Pb_3O_4, but of litharge, PbO, and intermediate grades of the highly dispersed type. If inert gas is substituted for oxygen, finely divided metallic lead can be produced. This is also applicable to other metals, which opens up an interesting field for future developments in many directions.

Micrograph slides, at a magnification of 1200 diameters, were shown, revealing that this new product consisted of a proportion of very small particles, in the order of 1.5 m.u. diameter, together with a proportion of larger conglomerates up to 10 m.u. diameter, which are built up from a number of the small particles forming a type of crystal aggregate. Non-setting red lead, complying with B.S.I. Spec. 217, showed an increased number of particles in the order of 6 m.u., which were more solid in appearance and were not built up of smaller particles. Ordinary red lead to B.S.I. Spec. 217 showed a proportion of still larger particles, which were in the order of 15 to 20 m.u.

Slides (magnification 720) illustrating the behavior when ground in oil with (a) a modern edge runner mill and (b) triple roll mill following the edge runner, showed that the Vaprolite red lead conglomerates readily divide up and the result is a very uniform dispersion of the fine particles only, whereas with the normal types of red lead, ordinary or non-setting, the larger particles remain, even after prolonged grinding.

The weight per 100 m.l. of Vaprolite process red lead varies from 105 to 150 grams, i.e., an apparent dry density of 1.05 to 1.5 against normal BSI. red leads of about 300 grams per 100 m.l., an apparent dry density of 3. Ground in liquids, the bulking value of the new material is normal, i.e., it possesses the true specific gravity for Pb_3O_4, but after settling, the high bulk of the dispersed quality is still marked even when mixed in water or alcohol. The specific gravity is approximately 9.0. The Pb_3O_4 content, estimated as PbO_2, is 97-98%.

The fine particle size, ease of dispersion in simple media and high purity give such outstanding advantages in the paint form that it points to the production of a new type red lead rather than a technical improvement. From samples shown it was indicated that the new red lead gives a minimum of 50 per cent. increased hiding power against BSI. non-setting red lead. With the more even spray application the new red lead has twice the hiding power of the older type and prolonged grinding in oil has little or no effect on this ratio. When mixed with white lead the new highly dispersed red lead has about 30 per cent. greater tinting strength. The settling rate is generally high with lead oxide pigments on account of their density.

In addition to the chemical analysis, the shape and size of the particle are factors in the setting rate and red lead produced by the Vaprolite process has marked superiority in these respects. Also, the low settling rate, and high apparent bulk resulting from the dispersion of this pigment, give an accentuation of its non-setting properties so that ready-mixed paints may be stored for over 12 months and readily remixed by hand to their original condition.

Highly dispersed pigments give increased oil absorption, the BSI. test method requiring approx.: 15 per cent. by weight of oil against the normal red leads of 8-11 per cent., but when the oil is incorporated mechanically and well dispersed, Vaprolite process red lead will give a much lower figure and a stiff paste is formed with as little as 6 per cent. raw linseed oil due to the breaking up of the particles forming the nucleus. A small modification in the oil content will adjust the viscosity to that required.

The resulting red lead paint can be stored, ground in oil, over long periods, in a similar manner to other pigments. The high covering power and fineness give ease of application with an excellent finish. The drying time is a little faster and continuity of film is given owing to the consistent and small particle size.

Summary of lantern lecture before the Birmingham Paint, Varnish and Lacquer Club, May 5, '38.

High protective value against corrosion is the most important property of red lead paints and authoritative reports have proved this beyond dispute. The superior results given by the finer non-setting red leads as against the coarser grades have also been established. Pigments composed of a large proportion of particles of about 1.5-2 m.u. diameter have better protective values, the larger surface per weight value giving greater uniformity, opacity and improvement of the properties of the resulting film. The surface to be protected is more completely in contact with the red lead particles and the danger of weak or exposed spots, which occur with coarser particles, is avoided.

The uniformity of finer particles given by the new red lead points to better protective value, and laboratory tests, and extended tests by Government departments on the Continent have shown that the protection is equal, when applied by brush, using ⅓ less weight of Vaprolite process material compared with non-setting red lead.

The purity of the red lead made by the direct process commends itself to many industries such as for pottery glaze and glass manufacture. Here the absence of iron, except in minute traces, is essential for the manufacture of clear products, free from color tint, etc.

The highly dispersed red lead is also attracting much attention in electric accumulator plate manufacture. The increased surface of pigment exposed to the acid results in a marked increase in the electrical capacity per pound of plate.

Pesticide

Sulfur ore deposits located in the Bayac district, Department of Gard and Ardeche, France, contain a bituminous limestone which improves the adhesion when used as a vine spray. In spite of the low sulfur content, therefore, the material is an effective pesticide (*Chemical Age*, June 11, '38, p.463).

Soy-tung Paint Oil

Successful commercial use of a hybridized soy-tung paint oil was announced by M. F. Taggart, Director Research, O'Brien Varnish Co., So. Bend, Ind., at the recent Farm Chemurgic Conference held in Omaha. During his talk Mr. Taggart said that it has been known that tung oil must be given certain heat treatment to become really usable in paint. Raw soyoil is also in need of modification. It was discovered that if raw soy was mixed cold with raw tung oil and the mixture of oils was conjointly heat treated quickly to 850° F., that both oils were now mutually modified into a new type of oil which lends itself admirably to the production of paint. The temperature of treatment is 200° above that of destructive distillation, but the pressure is kept so high as to minimize cracking. *Paint, Oil & Chemical Review*, May 26, '38, p.23.

Iodine Control

Experiments to develop a permanent, simple means for stabilizing iodine content of salt, limestone, minerals, and mineral mixtures were conducted at the University of Wisconsin and new method is announced by Merck & Co., Rahway, N. J. Wisconsin Alumni Research Foundation has filed patent applications and Merck is designated as licensee with adjunctive authority to sublicense salt, limestone, and mineral manufacturers. Samples to be iodized will be submitted by prospective sublicensees for examination and will be studied by the Foundation. For the protection of manufacturer and consumer, the Foundation will maintain a field control service for periodic check on the iodine level of the finished product. This service will include testing of stocks in distributing channels. Method is cheap, practical, and easy to apply. Its use will be encouraged by feed manufacturers seeking a positive iodine control through the use of stabilized mineral supplements, and is of special interest to feed control chemists.

New Natural Congo Resin

A new natural Congo resin, called Prum Resin, has been discovered, according to *National Paint Bulletin*, May, '38, p.11. It is said to have possibilities as a rust preventive, and in casein paints. Synthetic resins of various colors, ranging from yellow to dark brown, can be made by combining with resorcinol, phloroglucinol or pyrogallol with sulfuric acid and glycerol.

Impregnating Resin for Castings

After a few years' use by several foundries, General Plastics, N. Tonawanda, N. Y., announce their 278 impregnating resin, for increasing the density of certain types of castings, to be commercially available. Castings of the proper alloy, of course, will withstand high liquid or gaseous pressure, but often an alloy may be specified for reasons of chemical resistance which may not be the most desirable type for casting a solid, nonporous structure. Occasionally, too, the necessary design of the casting may present problems in manufacture which cause difficulty in feeding in the correct way to overcome shrinkage. Slight porosity of castings which results from these causes is successfully overcome and the casting made tight by use of this solution. Proper impregnation is made by pressure or vacuum and pressure.

Cationic Reagents in Flotation

Certain compounds used as stains by biologists and as dyes by the textile industry are examples of cationic compounds now claimed to be effective reagents that may be used in the flotation process to increase the value of various ores. Subject is discussed in an article entitled "Progress in the Use of Cationic Reagents in Flotation," by R. S. Dean, J. B. Clemmer, and P. M. Ambrose, Metallurgical Division, Bureau of Mines, Department of the Interior, which appears in the current issue of *Mining and Metallurgy*. By selecting proper reagent and by regulating pH of the pulp being treated, a wide variety of ores may be treated. Quartz has been floated from hematite, and chromite and sulfides from their siliceous gangue. Also, quartz was floated from feldspar, from kyanite, and from spodumene. Cationic reagents are sensitive to heavy metal ions and to slime, and potassium ferrocyanide and sodium fluoride are suitable addition agents. Cationic reagents are effective frothers, but, to save cost, auxiliary frothers such as pine oil and cresylic acid, may be used.

Phosphorescent Pigments

Mixtures of certain inorganic compounds, such as those of dehydrated boric acid, or the sulfates of aluminum, beryllium, zirconium, or thorium, may be activated by the addition of suitable organic compounds (*Paint, Oil and Chemical Review*, May 26, '38, p.18). This process is capable of numerous modifications. It is, for example, possible to produce a satisfactory phosphorescent pigment by partial dehydration of an intimate mixture of crystalline calcium monophosphate with small amounts of an organic activator. Pigments of this type may also be blended with other phosphorescent pigments. These phosphors, on the basis of phosphates, have a certain similarity to those on boric acid basis, but are superior to the latter because they do not require an expensive purification step and make possible the manufacture of very bright phosphors by the use of such organic activators as terephthalic acid, or similar tri or tetra carboxylic acids of benzols or its homologues.

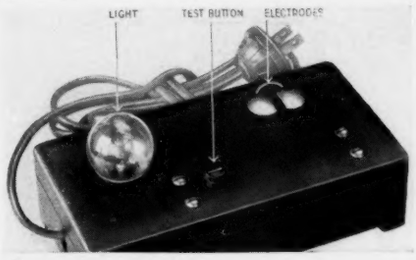
According to a German Patent (652,609) 5000 parts of calcium monophosphate and one part of terephthalic acid are mixed intimately by grinding in a mortar, partially dehydrated by heating in an air bath at 250° C., and allowed to cool. After exposure to ultra-violet light, the pigment shows a bluish phosphorescence. When using five parts of phthalic acid or five parts of benzol tetracarboxylic acid and activating by the addition of ten parts of Uranine, pigments are obtained which exhibit phosphorescence ranging from white to bluish white.

ADVERTISEMENT—*This entire page is a paid advertisement.* *Prepared Monthly by the U. S. Industrial Chemical Co., Inc.*

SOLVENT NEWS

Reg. U. S. Pat. Off.

JULY ★ A Monthly Series of Articles for Chemists and Executives of the Solvent-Consuming Industries ★ 1938



Electrical Resistance Detects Emulsion Type

An instrument for determining whether emulsions are the "water-in-oil" or "oil-in-water" type utilizes their difference in electrical conductivity, according to a recent article. A dab of the cream to be tested is placed between two nickel silver electrodes and the circuit is closed with a test button. An "oil-in-water" emulsion will pass sufficient current to light a low-wattage neon bulb, while a "water-in-oil" type will not, it is said.

Testing Cosmetic Creams

The author claims that the instrument is useful "in developing creams and other emulsions . . . to demonstrate whether a cream is of a 'nourishing' type, that is, water-in-oil, or a 'vanishing' type, oil-in-water . . . to study the inversion of emulsions and also to determine whether an emulsion or cream is breaking."

Mfg. Chemists Assn. Told Cost of "Chemical Jobs"

SKYTOP, Pa.—It takes an average investment of $11,250 for each job in a chemical plant, or $8,156 based on "factory and non-factory chemical employees," members of the Manufacturing Chemists Assn. learned at their meeting here on June 2nd. This statement was read from the report of a survey made by the Chemical Alliance which also showed the $5,223 of the latter figure is for capital assets and $2,933 for working capital.

A record attendance of 200 members re-elected last year's officers as follows: president, E. M. Allen; vice presidents, George W. Merck, Charles Belknap, and J. W. McLaughlin; secretary, Warren N. Watson; executive committee, H. L. Derby, chairman, Leonard T. Beale, William B. Bell, R. N. Chipman, J. H. Dunbar, Russell H. Dunham, Lammot duPont, August Kochs, Clyde D. Marlatt, Charles W. Millard and Chas. S. Munson, president of the U. S. Industrial Alcohol Co.

New Reagent Identifies Viscose, Bemberg Silks

CAMBRIDGE, ENGLAND — Viscose and Bemberg silk may be readily distinguished in ultra-violet light by use of the following reagent, it is reported in *Nature:*

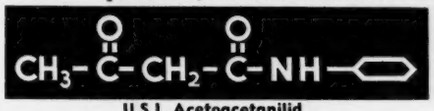
0.5 gram of acronol yellow T.S. is dissolved in 50 cc. alcohol and the solution mixed with a solution of 0.5 gram anhydrous sodium carbonate in 50 cc. water heated to boiling and allowed to cool. The material under examination is immersed for a few seconds in the reagent, then removed, washed with cold or warm water and examined in filtered ultra-violet light.

Bemberg silk fluoresces, it is said, with a brilliant bluish color, viscose a very dull blue, and cellulose acetate a luminous violet-blue.

U.S.I. Products Spur Advances In Color Photos and Resin Synthesis

Acetoacetanilid In New Color Photography Developer; Ethyl Acetoacetate Aids Amine-aldehyde Resin Manufacture

NEW YORK, N. Y.—To their important uses in the manufacture of Hansa yellows and other dyes may be added two potentially significant applications for the U.S.I. products, Acetoacetanilid and Ethyl acetoacetate, recent patents granted by Patent Offices in two countries indicate.



U.S.I. Acetoacetanilid

Successful application of Acetoacetanilid in a process for the production of colored photographic images in layers of gelatin or carrier, such as collodion or an organic ester of cellulose, is reported in this country by inventors Leopold D. Mannes and Leopold Godowsky, Jr.

On another front, a new British patent reveals how Ethyl acetoacetate may be used in the manufacture of amine aldehyde resins which have valuable properties.

Considering all the implications of the two patents, it would seem a fair guess that there remain many unexplored applications for Acetoacetanilid and Ethyl acetoacetate and that research with the compounds will pay dividends.

Has Reactive Methylene Group

Mannes and Godowsky, for example, found that when Acetoacetanilid is incorporated in a developer, colored compounds result from a coupling of the oxidation product of the developer (mono-, di-, and triamino aryl compounds) to the reactive methylene group of the Acetoacetanilid, the patent papers disclose. An important condition which this reaction meets is, they assert, that the color forming compound (Acetoacetanilid) is not oxidized by the sodium sulphite which it is desirable to have in the developer.

This is especially valuable, they point out, because it makes possible the deposition of colored photographic images in the gelatin or other silver halide carrier adjacent to the metallic silver grain and simultaneously with development. Further, they emphasize, the dyes thus formed do not readily wander from the place of formation.

In other variations of the process, they mention that it is also possible to incorporate the Acetoacetanilid in the sensitive emulsion layer. Also, by employing films with superposed layers of emulsions, differentially sensitized, the dyes formed may be bleached, col-

(Continued on next page)

Varnish Makers Can Reduce Resin Stocks

How the varnish maker can reduce resin inventories by selecting from three fundamental types will be the subject of an article in the next issue of SOLVENT NEWS.

The three resins—Rauzene N-100, Rauzene N-300 and Rauzene QD 1—are phenolics manufactured by the Synthetic Resin Division of the U. S. Industrial Alcohol Co. Samples of these resins or others in a complete line of phenolics may now be secured from U.S.I.

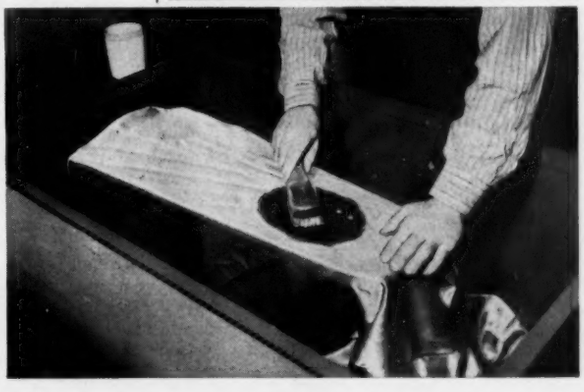
Alcohol Is Solvent In New Dry Cleaning Fluid

COLORADO SPRINGS, Colo.—Denatured alcohol properly combined with other ingredients will produce an outstanding dry cleaning fluid, it is claimed in a patent granted an inventor here. A preferred formula described as both "pervious" to water and completely miscible with dry cleaners' gasoline or Stoddard's solvent is given as follows:

Benzol	53 oz.
Stoddard's solvent	32 "
Denatured alcohol, special formula	11 "
Oleic acid	16 "
Amyl acetate	3 "
Castile soap (by wgt.)	2 "
Ammonia water	3 "
Pure water	8 "
Caustic potash (by wgt.)	¼ "

The denatured alcohol the inventor prefers is composed of 100 parts by volume ethyl alcohol, 5 parts wood alcohol, or other pure methyl alcohol, 5 parts ethyl acetate, 1 part aviation grade gasoline. [Ed. Note—This is practically identical to the composition of U.S.I.'s proprietary solvent SOLOX.] Methyl alcohol, ethyl acetate and gasoline increase the solvent and detergent properties, it is said.

Because this liquid is free from heavy oils, it requires less distilling and caustic to purify after it has been used, the patentee declares. This features, he adds, also makes it an easy liquid to filter through fine metal screens.



SPOTTING

Removal of stubborn spots on fabrics, fur, leather goods, etc., without injury to the garment is claimed for the dry cleaning fluid, described above, made with alcohol. *Picture courtesy the National Cleaner & Dyer*

ADVERTISEMENT—*This entire page is a paid advertisement.*

Water-saturated Butyl Alcohol Extracts Most Carotenoid From Cereal

WINNIPEG, MANITOBA—Extensive tests indicate that water-saturated butyl alcohol extracts more carotenoid pigment from cereal products than the naphtha-alcohol commonly used, experimenters from the Grain Research Laboratory here report.

Extracts obtained are easily centrifuged or clarified, are extremely brilliant and free from turbidity, and have comparable spectral distribution curves, their report, published in a recent issue of *Cereal Chemistry*, states. Other advantages in favor of butyl alcohol are its relatively low solvent power for the flavone pigments of flour and its stability to atmospheric moisture conditions.

Previous objections to naphtha-alcohol solution have been based on its sensitivity to moisture and a tendency to separate into two phases.

The experimenters investigated more than 60 commercially available organic solvents but state they found none which met all requirements as well as did butyl alcohol containing about 19.5% water of its weight at room temperature.

Claims Elimination Of Free Ions Stops Rust

SELINSGROVE, Pa.—How to prevent rust and corrosion on iron and steel by coating the surfaces with a composition which forms non-ionizing iron salts is revealed in a patent recently granted an inventor here.

Nitrogen-containing chemicals such as ammonium sulfocyanate, potassium ferrocyanide, urea, and the like, are adaptable to this method of treatment, the patent reports. The inventor cites his preference for the ammonium compounds of these reagents, however, since it is easier, he claims, to eliminate such volatile bases by the heating or baking operation which is part of his process.

A typical composition is given as follows: Using 125 cc. of butyl alcohol as a blending agent, 200 cc. of gasoline are mixed with a solution consisting of 7 gr. of ammonium sulfocyanate in 75 cc. of methanol. The resulting solution is mixed with a suitable priming paint and applied to the iron or steel articles. Heating to about 200°F for about 30 minutes eliminates the ammonia and volatile solvents.

Surfaces treated in this manner may be subjected to any desired finishing operation, the inventor asserts.

U.S.I. Products Aid Color Photos, Resin Synthesis

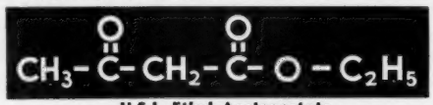
(*Continued from previous page*)

ored and rebleached a number of times without destruction of the silver image, thus permitting the formation of natural colored images in superposed layers.

When 15 parts of acetoacetic ester (Ethyl acetoacetate), 43 parts of diethylaniline and 75 parts abietinol are mixed with 450 parts water and 700 parts acetaldehyde, a crude resinous material forms under certain conditions, British Patent 474,034 reveals.

Reacting this crude material with 190 parts of 30% formaldehyde solution and following with suitable treatment, results in the formation of a pale, hard resin with a softening point of 63° C. This resin, the patent papers continue, is suitable in many applications, a few of which are spirit varnishes, oleoresinous finishes, nitrocellulose lacquers, and as a polishing agent for light colored woods.

Of course, this is not the first time the importance of Ethyl Acetoacetate in synthesis has been recognized. The reactivity of the hydrogen on the Carbon adjacent to the $C00C_2H_5$ group is well known. As a further example, the products formed by the addition of ammonia, aniline, urea and like compounds have a tendency to close into ring structures of the most varied types.



U.S.I. Ethyl Acetoacetate

Many of these developments have been held in abeyance by the former high price of this ester. However, if the British Patent described is any criterion, it now seems established that, at its present moderate price, Ethyl Acetoacetate is destined for some unusual commercial uses, in addition to its present applications.

For more than a decade U.S.I. has been the foremost manufacturer of Ethyl Acetoacetate and Acetoacetanilid. Manufacturers may secure from U.S.I. samples of current production for experimental purposes.

TECHNICAL DEVELOPMENTS

Further information on these items may be obtained by writing to U.S.I.

Concrete, stucco and masonry can be protected against staining and efflorescence by spraying or brushing with a new transparent damp-proofing material, a recent announcement states. The liquid is said to be water-white, not a wax solution, and to have excellent penetrative qualities.
U S I **(No. 111)**

A viscosity stabilizer with strong wetting and anti-oxidant properties has been introduced, according to a recent report. It is soluble in all vegetable and animal fats, waxes, petroleum oils and distillates, the manufacturer states. Specific applications named are in varnish and lacquer manufacture, textile industry and in stabilizing suspensions of dry materials in oily mediums.
U S I **(No. 112)**

Glassine paper fused with a microscopic film of aluminum has been developed to provide a low cost metallic wrapping. Principal advantages of the product are high grease- and moisture resistance and repellency to light and heat, according to the manufacturer. **(No. 113)**
U S I

Rust preventive paint which can be applied directly over any rusted or new, damp or dry surface is now on the market. The paint resists acid and alkali fumes and brine and by penetrating beneath the rust particles expels moisture, the manufacturer states. It is available in four colors and aluminum and clear forms. **(No. 114)**
U S I

Glass, metal foil, stainless steel, aluminum, copper, etc., can be bonded to porous surfaces such as wood, plaster walls, etc., with a new "animal base" glue in water solution, according to the manufacturer. He also states that the glue does not "blister" under any weather conditions; may be applied by brushing or spraying, and can be made waterproof by suitable modifications.
U S I **(No. 115)**

A penetrating and bonding oil paint which is said to combine some of the best features of both oil and casein paints, has been introduced. Principal advantages listed by the manufacturer are: suitable to application directly over calcimine or whitewash and damp surfaces, and sealing of water stains in one coat. It can also be supplied with a fungus and termite preventive, an announcement states. **(No. 116)**
U S I

Economical and efficient agitation or mixing of lacquer, synthetic enamel and other pigmented finishing materials, is claimed for a new hinged-lid mixing tank. The hinged cover is said to permit quick, easy filling yet, when clamped down, provides an inert atmosphere which prevents oxidation, leakage and overrunning. **(No. 117)**
U S I

Fine copper particles for incorporating in lacquers and oil, varnish and synthetic vehicles are said to give a non-porous, more impervious film, better gloss and 10 to 25% more coverage than copper heretofore on the market. Pastel shades are available, the manufacturer reports. **(No. 118)**

U.S.I. INDUSTRIAL ALCOHOL CO.
INDUSTRIAL CHEMICAL CO., INC.

WORLD'S LARGEST PRODUCERS OF ALCOHOL DERIVED SOLVENTS

Executive Offices: 60 East 42nd Street, New York, N. Y. Branches in all Principal Cities

AMYL ALCOHOLS
Refined Amyl Alcohol
Refined Fusel Oil
Secondary Amyl Alcohol

ETHYL ALCOHOLS
Specially Denatured
Completely Denatured
Anhydrous Denatured
Absolute—Pure
C.P. 96%—Pure and Denatured
Pure (190 Proof)—Taxpaid, Tax Free

*SOLOX—The General Solvent
*SUPER PYRO—The premium Quality Anti-freeze

SYNTHETIC RESINS

BUTYL ALCOHOLS
Normal and Secondary

ISOPROPYL ALCOHOL

METHYL ALCOHOLS
95%, 97% and Pure
METHYL ACETONE

ETHYL ETHER
U.S.P. and Absolute (A.C.S.)

COLLODIONS
U.S.P., U.S.P. Flexible and Photo
NITROCELLULOSE SOLUTIONS

DIAMYL PHTHALATE
DIBUTYL PHTHALATE
DIETHYL PHTHALATE
DIMETHYL PHTHALATE

ACETIC ETHER
AMYL ACETATES
High Test Commercial
Technical Secondary
BUTYL ACETATES
Normal and Secondary
***DIATOL**
DIETHYL CARBONATE

ETHYL ACETATES
85-88%, 95-98%, 99% and U.S.P

ETHYL LACTATE
ISOPROPYL ACETATE
AMYL PROPIONATE
BUTYL PROPIONATE

ANSOLS
Ansol M Ansol PR

ACETOACETANILID
ACETOACET-O-CHLORANILID
ACETOACET-O-TOLUIDID
ETHYL ACETOACETATE
SODIUM ETHYL OXALACETATE
PARACHLOR-O-NITRANILINE

ACETONE
DIBUTYL OXALATE
DIETHYL OXALATE
ETHYL CHLORCARBONATE
ETHYL FORMATE
ETHYLENE
URETHANE

***CURBAY**
POTASH BY-PRODUCTS

*Trade-mark registered

New Lamp Tubing to Replace Neon

A new fluorescent lamp tubing, Zeon, is shortly to replace the familiar Neon lights, according to an announcement by Claude Neon Lights, Inc. New light is claimed to be ten times as brilliant and no more costly than the old Neon lights and will generate less heat.

Permanently Liquid Oiticica Oil

Of interest to the paint and varnish industry is a permanently liquid oiticica oil, trade-marked Cicoil. Brazil Oiticica, Inc., 80 Broad st., N. Y. C., manufacturer, claims that the greater convenience of handling the liquid oil as well as its quality, uniformity, low acid number and excellence in analysis have resulted in an increased use of the oil in many formulations.

Acid Creams in Place of Soaps

It is claimed that some manufacturers are discarding use of soap as emulsifying agent in cosmetic creams and are producing "acid creams" with favorable results (*Schimmel Briefs*, May, '38). One patented product, known as Tegacid, consists of a mixture of glycerin monostearate and a sapamine salt. A suggested cream base contains Tegacid 10, petroleum jelly 20, liquid petrolatum 10, water 60.

Myristyl alcohol (tedradecanol) used in making soaps, creams, etc., is said to give the products great softness, increased penetrating ability, and has the property of fixing the more volatile constituents. This use has been patented.

Willow Bark as Sack Material

A new Vienna process utilizes willow bark fibre in place of jute as a sacking material (*Chemical Age*, June 4, '38, p. 448).

Ethylene Diamine in Copper-plating Baths

Tests on use of ethylene diamine in copper-plating baths, reported by Professor C. J. Brockman and Professor J. H. Mote, of the University of Georgia, at a recent meeting of the Electrochemical Society, indicate that solutions of copper sulfate containing sufficient ethylene diamine to produce a clear blue solution do not deposit copper on iron by contact, and may be used, therefore, for copper-flashing steel parts. The best deposits were those obtained at 50° C., using current densities from 0.025 to 0.20 amperes per square inch from solutions containing 50 grams per litre of copper sulfate (*Chemical Trade Journal*, May 20, '38).

Resinous Products from Molasses

Experiments in converting molasses into an insoluble resinous product suitable for use as a road-surfacing material have been conducted for some time by the Imperial Institute of Sugar Technology at Cawnpore, India, and success has now been fairly achieved (*Chemical Age*, Apr. 9, '38, p. 283).

The process of manufacturing consists in carrying out the resinification of molasses with a mixture of coal tar and asphalt in the presence of acids, such as sulfuric. The carbohydrates contained in molasses combine with the phenolic bodies contained in asphalt and coal tar to form a resinified compound, insoluble in water. It is said to satisfy the following conditions: (1) It is completely liquid at the time of application; (2) after being spread on the road, it does not melt in hot weather; (3) it is not worn away by heavy traffic; and (4) it is cheaper than other asphalt preparations on the market.

The success of the manufacturing operation depends upon the removal of the last trace of moisture from the molasses before mixing with the other ingredients. The top surface of the molasses tarmacadam composition sometimes shows signs of peeling off at the surface after two or three months, unless a suitable smooth seal coating material is applied. A good seal coating material is prepared by dissolving the molasses-asphalt-coal tar composition in the proportion of one lb. to one gal. coal tar. The seal coating material is quite liquid and easy to apply to the road surface.

Petrol from Wood

Described as a new process, the production of petrol from wood by extraction has been developed by H. Bergstrom and K. Cederquist, and will be worked on the large scale by A. B. Skanska Aettiksfabriken, of Perstorp, Sweden. Wood, sawdust, wood charcoal, or wood tar, can be used as raw materials, the yield being about 35 per cent. The method, it is stated in *Chemical Trade Journal*, June 3, '38, p.472, required ten years for its development, and received during this period the support of the Swedish Academy of Applied Sciences.

New Use for SO_2

A new use for sulfur dioxide gas in the destruction of grain field weeds has given highly encouraging results in experiments by Freeport Sulphur Co. at Port Sulphur, La. Gas is generated in a simple burner on a truck, and released under a large trailing "blanket."

Charcoal-base Fertilizer

A measured fertilizer with a charcoal base that has no waste is announced by Atkins & Durbrow, N. Y. C., being sold under the name of Char-Gro. New product is made in clean granular pellet form, and is described as odorless and easy to handle. It distributes evenly and there is no separation of plant food elements. Each pellet contains measured nourishment in the ratio of 4 per cent. nitrogen, 16 per cent. phosphoric acid, and 4 per cent. potash, an excellent balance for promoting healthy growth.

Three-color Film Process

A new three-color process for motion picture films has been patented in Hungary and is called Filmgraphic. The claim is made that any number of copies can be prepared from one negative (*Chemical Age*, May 21, '38).

Fatty-acids Process

A process for manufacture of fatty acids from fish oils has been developed by Dr. G. Matsumoto and his collaborators, at the Osaka Experimental Laboratory of the Ministry of Commerce and Industry, Japan. In process, which is claimed to be entirely new, fish oil is first pressure-hydrolyzed into glycerine and fatty acids. The latter are then separated by vacuum distillation into two fractions, one (constituting some 65 per cent. of the total) comprising the lower molecular weight products and the other (accounting for 25 per cent.) of the higher molecular weight materials. The former products are then treated by the hydrogenation process and transformed into fatty acids that are perfectly serviceable for the manufacture of toilet soaps, candles or other materials normally made from tallow. *Chemical Trade Journal*, June 10, '38, p. 492.

Fuller's Earth for Water Softening

Further progress in development of methods for production of base-exchange materials from British clays is recorded by Director of Water Pollution Research Board, in a report for the year ended June 30, '37 (*Chemical Trade Journal*, May 13, '38, p.391). The more recent work, conducted in the Chemical Research Laboratory at Teddington, has been centered mainly on Fuller's earth which, as earlier experiments had indicated, is the most promising material so far discovered for the preparation of artificial zeolites with a base-exchange capacity equal to that of imported treated clays. The earlier results showed that Fuller's earth is best activated by treating with hydrochloric acid, drying, baking at a temperature of between 550° and 600° C., and finally treating with solutions of sodium silicate and sodium aluminate. It has been ascertained that the base-exchange capacity of the final product depends upon the type of Fuller's earth used, the yellow weathered varieties proving, in general, more satisfactory than the blue varieties. Further experiments, with the object of discovering the cause of these differences, are in progress.

Powdered Corncobs Used in Soap-making

Powdered corncobs improve the mechanical-detergent action of soaps when present in the proportion of 10 to 75 per cent., according to the claim of a recent Hungarian patent, reported in *Chemical Age*, May 28, '38, p.429.

Milling and Scouring Agents

New synthetic milling and scouring agents of I. G. manufacture are being sold by General Dyestuff under the name of Medialan A, A Pdr., and AL. The A and AL are in paste form; the A Pdr. is supplied in powder form. Company claims that in comparison to soap, products have better resistance to hard water, low sensitivity to acids, excellent milling effect, do not split hydrolytically in aqueous solutions, thereby enabling neutral scouring, and are very easily washed out. General Dyestuff also announce Igepal W, a synthetic scouring agent for processing wool and mixed fibres containing wool.

Kauri-butanol Solution

A specialty for use in making solvent power tests (solvency) on petroleum hydrocarbons such as mineral spirits, V. M. & P. naphtha or lacquer diluents is being marketed under the name S. R. L. Brand Kauri-Butanol Solution, by Stewart Research Lab., 315-22d st., N. W., Washington, D. C. Material has been standardized in accordance with the various Production Club methods and gives technicians the assurance that everyone can use a uniform and strictly comparable reagent. Being ready-to-use, it simplifies the preparations for the test, and its use is said to result in a great economy of time and money.

Alcohol Extraction Process for Soy Bean Oil

Improved yields of soya bean oil when using the alcohol extraction process are reported by operating in presence of certain salts (sodium chloride, sodium acetate, calcium chloride) and soaps. In the case of calcium chloride the effect is due to an increase in the solubility of the oil in alcohol and in that of soaps to a reduction in the interfacial tension between oil and alcohol (Igavasi and Isida, *J. Soc. Chem. Ind., Japan 40*, 271 B).

Amorphous Waxes

A group of amorphous waxes offered by J. C. Scurlock & Co., 1225 Venice Blvd., Los Angeles, Calif., have outstanding characteristics which make them of use in many applications. The waxes remain amorphous after continued or repeated heating. They are plastic at temperatures somewhat below the A.S.T.M. melting point (165° F.), but films are unaffected by indefinite submersion in water at 175° F. Plasticity is noticeable at freezing temperatures, making them quite valuable where it is necessary for films to withstand shocks at temperatures where other waxes (paraffins, etc.) break. They are also chemically inert. Manufacturer claims they are good substitutes for beeswax, where saponification is not required, also for ozokerite, where hardness is not the prime factor. They are tasteless and odorless, even on repeated heating, being used for lining food containers, wine tanks, distilled water tanks, etc.

Low-alloy Steel

A new low-alloy, high elastic steel, marketed by Alan Wood Steel Co., Conshohocken, Pa., has been named "Dyn-El." Carbon is reported as generally present to the extent of 0.11 to 0.14 per cent., varying with the thickness of the steel. Manganese is maintained at 0.50 to 0.80 per cent. because within this range it is claimed that strength is obtained without brittleness. Phosphorus is held at 0.06 to 0.10 per cent. which, in the presence of copper, is said to increase corrosion resistance. Copper is aimed at 0.30 to 0.50 per cent. which is believed to insure maximum efficiency in corrosion resistance. Company states that the chemical composition has been so developed that the steel when hardened and tempered by the Alan Wood patented quenching and tempering process, develops a minimum of 50,000 lbs. per sq. in. elastic limit without the excessive use of hardening alloys. It is pointed out that this balance has been so developed as to allow no embrittling effect during or after welding.

Tests on New Paper Materials

Lalang grass (*Imperata arundinacea*) is reported in *Industrial & Engineering Chemistry*, News Edition, June 10, '38, p. 330, as having been suggested as a source of pulp for papermaking. Report states that tests made in India indicate it is a promising material for this purpose, comparing favorably with Algerian esparto. Lalang is said to be a troublesome weed found in many parts of the eastern tropics, especially Ceylon and Malaya, India and Indo-China.

A sample of Illuk grass was recently tested at the Imperial Institute. The results show that it furnishes a fairly good yield of pulp by the caustic soda process from which paper of satisfactory quality can be made, harder and less bulky than esparto paper. The bleached pulp, either alone or in admixture with other materials, would be suitable for the manufacture of writing, book and printing papers.

New Use for Molasses

A method has been developed at the Molasses Laboratory of the Hawaiian Sugar Experiment Station whereby pure, edible lactic acid can be produced, using molasses as the raw material.

Month's New Dyes

General Dyestuff releases include: Algosol Green 13G, which produces a clear yellowish shade of excellent fastness properties; product can be resisted with the usual printing resist or discharged in pale shades with Rongalite CL discharge. It can be printed according to the chlorate and nitrite process. Rapidogen Bordeaux RN is more soluble and develops very much quicker in acid steam than the old R brand. It produces on cotton and rayon heavy bordeaux prints of good fastness to light and very good fastness to washing and chlorine. Chrome Yellow D is a new brand manufactured by General Aniline Works and offered by General Dyestuff. It may be dyed afterchromed, on a chrome mordant, and according to the chromate process. It exhausts well when dyed by the silk-white method and leaves silk effects clean. Pyramine Orange RF is a direct color which possesses very good fastness to storing, acid and scroop. It will color cotton and rayon evenly, and is recommended also for dyeing silk. Fastusol Blue LFFGGL is a homogeneous product which produces very bright shades on cotton and rayon.

A new color for use in the printing-ink, lake and allied industries is announced by du Pont in Monastral Fast Green GS, a straight, unshaded pigment which produces bright emerald shades of green. It possesses the same fastness to light, alkali, acids and lime as the older product, Monastral Fast Blue BSN. It is non-bleeding in oil, water and alcohol.

An important addition has been made by I.C.I., Ltd., to their range of Soledon (solubilized vat) dyestuffs. New color is Soledon Brilliant Green 5GS Powder (patented), which gives brilliant yellowish green shades, and should be found particularly valuable in cases where the application of insoluble vat dyestuffs by the normal reduction process would lead to difficulties due to inadequate penetration, uneven dyeing, or destruction of color already present.

Comparing Trade-Named Products

In the May issue, page 550 (New Products Section), in a brief synopsis of a report made by the American Commercial Attache in Berlin, a comparison of the products of several waterproofing compounds was made. The Impregnole Corp., 580-5th Ave., New York City, has called to our attention that the products mentioned are all trade-named. It is, of course, not our editorial policy to compare the respective merits of trade-named materials—our apology to all the companies involved.

Chemical Specialties for Industry

A digest of new uses and new compounds

Household Insecticides

By Benjamin Levitt

THE destruction due to household pests is inestimable. Not only is the financial loss very great, but the psychological effect of many varieties of vermin which plague the householder are even more serious than the monetary loss. In 1935, according to the Census Bureau, the value of household insecticides and repellents manufactured in the U. S. was $13,302,727, divided as follows:

Kind	Amount Lbs.	Value
Fly Sprays	21,188,424	$ 5,722,930
Pyrethrum Insect Powder	4,383,922	1,408,511
Fluoride Powders and Mixtures	834,370	424,850
Moth Repellents	3,440,131	1,095,118
Household Insecticides and Repellents not reported by kind	.....	4,651,318
Total		$13,302,727

Cockroaches

One of the most offensive household pests is the cockroach. This insect feeds on dead animal tissue, starches, sugar, and in fact anything edible. For this reason restaurants, bakeries, households, pantries, and kitchens are the most favorable habitat. They thrive best in dark, warm and moist atmosphere. They also attack book bindings from which they eat the starch and glue sizing materials.

Methods of Control

The long thin shape of the insect facilitates their crawling into very fine cracks and crevices. Hence, the first remedy is to putty up and paint all cracks and holes. The most effective chemical thus far found is sodium fluoride, which should be dusted into infested cracks and runways. The poison clings to their bodies, and in cleaning themselves, the insects swallow sufficient for their extermination.

Many states have passed laws prohibiting the sale of sodium fluoride as is, on account of its poisonous nature, and being a white powder, it is easily mistaken for other materials used in the household. To avoid mistakes, it is colored Nile blue. Containers should bear not only the poison label but also the antidote.

Sodium fluoride mixed with nine parts of lime is said to be very effective, being both a contact as well as stomach poison.

While sodium fluoride can be extended with an inert spreading agent such as Fuller's earth, or silica, the insecticide laws require a statement as to the percentage of active poison present. Obviously, the sale of such diluted materials is deterred in a measure by a statement of that kind.

A poison bait especially attractive to the large roach is prepared, according to Pettit of Michigan, by cooking a thin gruel of cottonseed meal sweetened with molasses. When cool, add a cake of yeast to start fermentation, after which a small amount of powdered lead arsenate is added. The bait is placed on plates where the roaches may reach it, but out of contact with animals, and should be kept moist.

The roach is also susceptible to insect powder (pyrethrum) which should be of high quality and very finely ground.

U. S. Patent 2,024,098 describes the use of 10 parts p. thiocyanodimethylaniline mixed with 90 parts chalk, talc or kieselguhr as an effective exterminator for roaches and other insects.

The House Fly

This insect is universally present during the summer and is said to be the cause of many summer diseases. As it multiplies extremely fast, control measures should be thorough.

Methods of Control

Two materials stand out as excellent for the production of fly sprays. They are pyrethrum extract and kerosene solutions of organic thiocyanates.

Pyrethrum or insect flowers, botanically known as *Chrysanthemum cinerariaefolium*, is cultivated commercially in Dalmatia, Montenegro, Japan, France, Australia, Algeria and California, but the first three countries produce nearly all the flowers entering into international trade. U. S. imported 20,091,596 pounds in 1937, which was valued at $2,204,451.

For the production of pyrethrum sprays, the writer recommends the purchase of a standardized extract which is sold in several strengths, the most common of which is the 1:20. This strength may be diluted with deodorized kerosene in the proportion of 1 gallon extract to 19 gallons of kerosene. It is desirable to perfume the solution with essential oil citronella, methyl salicylate or special bouquets for the purpose, which are offered by every essential oil house. The addition of small amounts of paradichlorobenzene, adds pleasant odor, which promotes sales appeal. The finished spray should be equal in killing power to the official Test Insecticide of the National Association of Insecticide and Disinfectant Manufacturers.

This kind of spray may be used on animals without harm, because it has no toxic effect on man or domestic animals.

The thiocyanate concentrates are also sold in 1:20 strengths and should be prepared as directed by the manufacturers. Perfume, etc., should be added as in the pyrethrum sprays.

U. S. Patent 2,024,098 gives several examples covering the use of benzyl thiocyanate 1 part, in 99 parts of kerosene as a fly spray; 1 part p. thiocyanodimethylaniline in 99 parts water, acidified with hydrochloric acid; methyl thiocyanoacetate, amylo-B-thiocyanopropionate, phenyl thiocyanate or other volatile thiocyanate vaporized in a closed space to kill flies, mosquitoes, etc.

For keeping qualities, the thiocyanate sprays are superior to those made with pyrethrum, because they do not decompose with age, as do the latter. A product containing pyrethrum should not be packed in clear bottles. Some manufacturers of spray combine both products for retail sale. U. S. Patent 1,990,422 is an example of the latter, which combines an extract of pyrethrum with a thiocyanate of methoxy methyl thiocyanopropionate group, possessing the additional feature of making the insecticide especially attractive to insects, by means of vanillin, a food odor.

Bulletin 108, of the Hygienic Laboratory, describes a solution of one-half per cent. to one per cent. of formaldehyde, also a one per cent. aqueous solution of sodium salicylate as being effective muscacides.

Sticky fly papers are not quite as popular as they used to be, but in many cases are used to curb this insect nuisance, especially

where there is danger of contaminating the premises with an undesirable odor such as kerosene. Hygienic Laboratory Bulletin 108 reports that of a number of experiments, a composition of one part by weight of castor oil and two parts of white rosin was most satisfactory. This may be used in shallow containers.

Control of the Bed Bug

This insect is especially offensive because its food is obtained from human beings only. Its habit is to feed until it has gorged itself with blood and then to retire to a crack or other place of concealment in the bed or in close proximity thereof.

The most effective way to rid premises of this parasite is by fumigation with HCN gas. This, of course, should be done only by experts. The insect as well as its egg is also destroyed by fumigating with sulfur. Four pounds of sulfur per 1000 cu. ft. of space should be burned, and the gas should be allowed to act for five or six hours.

A five per cent. solution of compound solution of cresol in kerosene is useful when applied with sprayer.

Ants

Two kinds of ants infest households: the small red ant, which feeds on grease, and the larger black ant and the brown ant which prefer sweets.

Tartar emetic (antimony and potassium tartrate) has been proved a good poison for both varieties. For the sweet-loving ant, one part tartar emetic mixed with 20 parts of honey acts as a slow poison, thus permitting the ants to carry the food to the nest, where it kills the queen and the young. The grease-loving ants may be exterminated by mixing one part of tartar emetic with 20 parts of grease or bacon fat. This poison should be kept out of reach of children.

Sodium fluoride dusted in places frequented by ants is also an effective means of getting rid of them.

Cat and Dog Fleas

The small ovoid creamy white eggs of the flea are deposited on the hair of the animals and infect premises by falling out on rugs or mats. The insect metamorphoses from the egg to larva in two to 12 days, and after shedding its skin two or three times, becomes full grown in four days to several months. The pupal or resting stage takes place in a cocoon and, depending on the temperature and other conditions, the insect may pass three days to a year in the cocoon.

Animals which cannot be kept outside may be washed with a saponified cresol solution which kills fleas. The following used as a wash is also effective: two oz. laundry soap dissolved in one quart of hot water. Cool and add 2½ pints of kerosene to make an emulsion. The emulsion is diluted to five gallons with water for use.

Dry pyrethrum flowers rubbed into the fur is also good.

Naphthalene scattered on an infected rug in a closed room for a period of 24 hours, after which it is swept up and burned, is very useful.

Sulfur and HCN as fumigants (by experts) are most thorough methods.

Moth control has been discussed by this writer, in the March 1937 issue of this journal, page 284.

Acknowledgment is made of the following sources:

Penna. Dept. of Agriculture Bulletin 432.
Hygienic Laboratory Bulletin 108.
U. S. Public Health Service Reprint 626.
U. S. Public Health Service Reprint 1037.

Mar-proof Lacquer for Woods

A remarkably attractive and durable finish for wood and cabinets is announced by Schaefer Varnish Co., Louisville, Ky. This mar-proof nitrocellulose lacquer is a radical departure from the ordinary lacquer products and produces a finish that cannot be marred or scratched with the thumbnail, and is said to be very tough.

New Synthetic Yarn?

The possibility that chemical compounds at present used in plastics may form the basis of a new class of synthetic yarns has recently been shown by a product known as "vinyarn," which is spun from Vinylite, a synthetic resin made by Carbide and Carbon, and discussed in detail in *Rayon Textile Monthly*, June, '38, p.58. Company states that material is produced in extremely limited quantities and is not as yet commercially available, hence, is still in the experimental stage.

Textile Finishing Agent

A finishing agent designed for use on acetate and rayon fabrics is announced by du Pont. Known as "Avitex" R, it is also employed to some extent on cotton materials, and it is of interest on raw-stock to improve the spinning properties. It possesses an advantage in exhausting from solution from a long bath onto the fiber and in being resistant to subsequent rinsing, giving a soft, full finish. It is also resistant to hard water, hot ironing, and hot calendering, and is stable under storage conditions. Finish leaves materials free from odor and not discolored, and has no deleterious effect on the light fastness or on the shade of dyestuff.

Anti-fume Finish for Acetates

An anti-fume finish for fabrics containing acetate rayon is announced by Sandoz Chemical Works, N. Y. C. A number of complaints on the part of department stores, dry cleaners and consumers have been heard, which were attributed to the pressure of gas or acid fumes in factories, stores and homes. It was possible to prove that fading had been caused by such fumes in a few cases. New finish is applied by the dyer and finisher and the goods acquire a satisfactory full hand and no change occurs on account of the treatment. Samples of such goods, when subjected to gas or acid fumes, have shown no signs of fading.

New Soaking Treatment

Consistent production of a deep heavy pebble on rayon crepe yarns, which presents a serious problem for throwsters, may now be overcome through use of Albasol No. 1, a new type soaking treatment for deep pebble rayon crepe. National Oil Products Co., Harrison, N. J., manufacturer, states that experiments produced an unusually deep, uniform pebble.

New Accelerator

Santocure is the latest addition to the line of accelerators made by Rubber Service Labs. Division of Monsanto, Akron, O. New accelerator is in the same classification as the company's "Ureka" type. The major advantage of Santocure is said to be in its ease of handling through the plant. It requires a basic accelerator for activation, such as guanidines, aldehyde amines, etc., although combinations of 50 per cent. Santocure and 50 per cent. DPG can be handled with ease in all ordinary factory work.

Brushing Lacquer

A brushing lacquer which is transparent and said to produce a glossy film, known as Cooplac No. 825, has been placed on the market by Charles Cooper & Co., 10 Mulberry St., New York City. Product can be applied with a brush in the same manner as a paint. Smoothness and appearance are inherent properties of this lacquer. It is recommended for metal articles.

Process for Treatment of Finished Surfaces

The Macar Process is a new development for the treatment of the finished surfaces of automobile bodies, furniture and other products. It cleans and polishes in one easy operation, restoring the original luster and life to the finish. It comes in a can and looks like a wax, but according to the maker, McAleer Mfg. Co., 2431 Scatten Ave., Detroit, Mich., it is not a polish, a cleaner, nor a wax, but combines the properties of these various products.

Making Textile Finishes Permanent

By J. Wakelin

ALWAYS a definite quest goes on for things that are permanent, and quite in this line is that search for a means of making the dressing or finishing of textiles a more or less permanent matter. Whereas normally shirt collars, cuffs, etc., require constant laundering, there is evidence that before long, these articles will be made permanently stiff. One initial starching or stiffening will last for all time.

Again, the recent discovery of means of making fabrics permanently waterproof is similar: the distinctive feature of the process is that the finish resists washing with ordinary detergent and stands up to dry cleaning. Whereas the older metallic soap impregnations were removed by the dry cleaning solvents, water-proofing not so affected is now announced. Other new chemical compounds make these accomplishments possible, leaving out of the discussion certain mechanical methods of making textiles stiff by compounding two or more separate fabrics.

Almost all of the new compounds are derived in some way from formaldehyde or its polymers. These should not be confused with resins, since their only claim to that category is that they relate to an alcohol and an aldehyde which by some stretch of imagination may be thought parallel to phenol and formaldehyde. Formaldehyde may be made to yield an ether derivative. A fatty alcohol in contact with hydrochloric acid and formaldehyde gives an alpha halogen ether. If F-OH represents a fatty alcohol, then the product of interaction is of the type:

$$F\text{-}O\text{-}CH_2\text{-}Cl$$

Here, as will be seen, is a new and interesting derivative which may have potential uses still undiscovered. In particular, it will combine with tertiary amines to give a quaternary compound:

$$F\text{-}O\text{-}CH_2\text{-}Cl\text{-}N=$$

This simple chain of reactions is the basis of the preparation of octadecyl-oxymethyl-pyridinium chloride, and similar bodies, which give permanent waterproof finishes on textile materials. The "F" in the above formula may be any fatty alcohol groups—octadecyl, oleyl, and so forth, while the tertiary amine referred to may be pyridine.

A patent of several years back illustrates how alpha halogen ethers may be prepared, and how simply they may be converted to quaternary compounds.

The Deutsche Hydrierwerke advise 270.4 parts by weight of octadecyl alcohol to be dissolved in three times the amount of benzene, and 30 parts of trioxymethylene to be added. This is to be treated with dry hydrogen chloride gas at 5 to 10° C. which necessitates cooling. After the principal reaction is complete, the gas ceases to be absorbed and an aqueous layer which separates is removed, and the benzene layer dried and distilled off. The halogen ether is isolated by distilling the residue up to 200° C. under a pressure reduced to 2 or 3 millimeters. The reaction is stated to be very smooth, and the yield obtained from higher alcohols may be as high as 90 per cent.

The combination with amine to give a quaternary presents no difficulties. Equimolecular proportions of halogen ether and tertiary amine are mixed together. (Thus, 319 parts octadecyl chlormethyl ether as above, and 101 parts of triethylamine.) Combination takes place with heat evolved and when cooled the product is a solid. It has wetting-out properties and has good resistance to acids and alkalis.

Originally such bodies were noted only for the above qualities and for their use to improve the fastness of dyeings by after-treatment. Cotton and viscose rayon dyed with so-called direct or substantive dyes often possess but poor fastness to washing with soap and water. An impregnation of the dyed material in 0.5 per cent. aqueous cetoxymethyl pyridinium chloride gives better resistance.

Actual details of the waterproofing discovery have not been disclosed, but some person must accidentally have found that goods impregnated with the reagent, dried in the ordinary way and then *baked* undergo a quite unexpected change. Some decomposition of the quaternary ether goes on and pyridine is liberated, but the main transformation is the uniting of the halogen ether with cellulose. If the formula of cellulose be written $C_6H_9O_4$-OH, for the sake of simplicity, and final derivative formed is thought to be

$$C_6H_9O_4\text{-}O\text{-}CH_2\text{-}O\text{-}F$$

the cellulosic radical is seen to have supplanted the "Cl" atom in the halogen ether. The crux of the process is the baking, which differentiates the new discovery from the earlier known modes of using the halogen ether compounds.

Let us briefly review the practical details of the application of the ether derivatives to, say, cotton fabric. Water is the solvent stated here, but benzene and organic solvents may also be used with certain advantages.

Of octadecoxy-methyl-pyridinium chloride 2 parts are dissolved in 98 parts of water, into which solution cotton is dipped and withdrawn after thorough impregnation. It is squeezed and dried at a gentle heat (30° C.) and then baked for half an hour at 90° C., cooled and washed in benzene. (This wash is avoided if benzene is the solvent used in the first place.) The resultant fabric is water-repellent and soft, being unaffected by either dry cleaning or laundering.

The usefulness of fabrics made repellent to water is not confined to the production of tent material, out-of-doors wear clothing and such, but is capable of much wider adaptation. The Imperial Chemical Industries, Ltd., who are the proprietors of these "Velan" processes have found that the principle may be extended to make other kinds of textile finishes fast and permanent. Starch finishes, for example, may be made more lasting by treatment with a similar quaternary oxymethyl compound. In their British patent 472,389 they propose to dip cotton sheeting in a 10 per cent. corn starch solution first, squeeze and dry. Then they apply a solution containing 1 part by weight of methyl-oxymethyl pyridinium chloride in 99 parts water. The material is squeezed and dried below 40° C. and then subjected to 30 minutes baking at 105° C. The resulting stiff, smooth finish is resistant to removal by laundering treatments.

The above compound is of similar type to those referred to earlier, except that a methyl and an oxymethyl group is present in the molecule.

$$CH_3\text{-}O\text{-}CH_2\text{-}$$

The chloride of the above ether might presumably be prepared by interacting together methyl alcohol (instead of a fatty alcohol), formaldehyde and hydrogen chloride. Against this is the fact that the lower aliphatic alcohols do not react so readily in these conditions as the C_{10} and upwards. It is of interest that a recently published method of Imperial Chemical Industries, Ltd. combines the formation of the halogen ether with the combination to the quaternary stage both in one step. Instead of the acid employed being hydrogen chloride, sulfur

dioxide is proposed, so the resultant derivative is not a chloride but a sulfite or pyrosulfite.

Paraformaldehyde 8 parts, methyl alcohol 3.2 parts and 64 parts of pyridine are heated together to 80° C. and after removing the heat, sulfur dioxide is passed in and the temperature maintained at 80 to 90° C. without external heating. After the vigorous reaction subsides the mixture cools and separates into two layers. The oily, lower layer is withdrawn, washed with acetone, ether and dried at 30° in vacuo. The product, methyl oxymethyl pyridinium pyridine sulfite (and pyrosulfite) is a pale pink oil soluble in water but not in acetone or pyridine (Brit. Pat. 475,119).

It would be misleading to suggest that I.C.I. are the sole inventors in this particular field, for other concerns have patented new methods of making starch finishes permanent which are equally deserving of notice. A. G. Bloxam and the Society of Chemical Industry in Basle have an interesting method of applying a melamine-formaldehyde resin in conjunction with starch to obtain a permanent stiffened finish on cotton or rayon fabric. The advantage of melamine (triaminotriazine) over urea is that the resin required no acid for polymerization—a distinct advantage where acid-sensitive cellulosic fibers are to be heated. A simple condensation product is first prepared by heating together 3 molecular proportions of neutral aqueous formaldehyde and 1 proportion of melamine on a water bath under reflux. The reaction is allowed to continue until a portion of the liquor withdrawn and diluted with twice its volume of water yields a precipitate of resin.

A starch paste is made along the usual lines from 80 parts of potato starch and 1,000 parts water and is boiled. After cooling an addition of 10 parts of the above resin solution is made and cotton fabric is entered into the mixture. After thorough impregnation has been achieved, the fabric is squeezed and dried at ordinary temperature to remove the moisture. Then it is heated to 140° C. for 4 minutes. The latter heating causes the resin to polymerize, harden and become a permanent fixture, the starch dressing with it. Fabric so treated retains its stiffness after repeated washing. Melamine itself may be made by heating in an autoclave at 160° C. and high pressure equal weights of dicyandiamide and liquid ammonia.

Metal Polish

A dazzling metal polish which produces a deep shimmering lustre without haze, and leaves no heavy residue to cling on rough surfaces and cracks, is called Brevitee, and is made by Fuld Bros., 702 S. Wolfe St., Balto., Md.

Fire-resistant Transparent Wrappings

A new entrant into the field of transparent wrapping films is made of bentonite. Described at the Fifteenth Colloid Symposium, film is said to be fireproof and indestructible up to temperatures producing red heat. It is not only very strong, tough and transparent, but highly resistant to water, acids, alkalies, oils and has excellent properties of electrical resistance. Patent application has been filed.

Primers and Enamels

The Mirotex line of synthetic finishes, marketed by the Industrial Division of the Indianapolis Paint & Color Co., Indianapolis, includes both primers and enamels in air-drying and baking materials. The air-drying finishes are recommended principally for maintenance and architectural finishing, while the bake finishes are formulated for product finishing.

These finishes, used on metal surfaces, are noticeable for their smooth lustrous beauty, long durability and extreme resistance to grease, oil, plain or salt water, sulfur dioxide, heat, sunlight, solutions of acids and alkalis, bending, scratching, etc. The finish has the glass-like surface of porcelain enamel, but at the same time it is reasonably elastic or flexible.

Imitation Marble

Imitation marble made from asbestos sheet, white cement and a nitrocellulose lacquer will be made at the Krasny Stroitelj factory in Moscow district, Russia (*Chemical Age,* May 28, '38).

Water-emulsion Wax

A water-emulsion wax for linoleum, rubber, cork, asphalt-tile and hardwood floors, is reported in *India Rubber World*, June 1, '38, p.103. Product called Hornglaze wax, dries bright to a highly water-resistant film 15 to 20 minutes after application and does not require polishing. It will seal the pores and provide a hard, dry, non-slippery film which prevents the embedding of dirt. Elastic enough to be self-healing, according to the manufacturer, it will not scuff white or become brittle; neither will it remain soft and tacky.

Sticky, Adhesive Wax

A wax has been introduced which has the property of being sticky or adhesive. New wax exhibits high adhesive properties even on glass and metals. It is amorphous or non-crystalline and has high water-repellent properties. It blends easily with resins, oils and other waxes, the mixtures giving many unique and interesting results. Its adhesive properties make it of interest for application to handles of golf clubs, tools, tennis racquets, hammers, axes, etc., to prevent slipping. Manufacturer, Glyco Products, 148 Lafayette St., N. Y. C., recommends Flexo Wax C for coatings, laminating work of all kinds, and for fruit and plant protective coatings, etc.

Fungicide and Germicide

Stabilizer G4-50, new product of Givaudan-Delawanna, Inc., 80 5th Ave., N. Y. C., is said to hold considerable promise as a fungicide and germicide. Product is described as being a liquid of mild odor and light brown color, miscible with water, alcohol and acetone, insoluble in other organic solvents. It shows a slightly alkaline reaction, and its use is not recommended for aqueous solutions as a precipitation of a water-insoluble substance will occur. Aside from the preservation of mixtures containing carbohydrates or proteins, it is recommended for the leather industry, where the hides on their long way to the finished leather are continuously exposed to the attacks of bacteria which soften or even dissolve the valuable skin substances.

Ink for Faded Typewriter Ribbons

Renu-Ink, a colorless fluid for renewing the color of faded typewriter ribbons, has been introduced by Renu-Ink Mfg. Co., 140 West 42nd St., New York City. New product brings the ink from the unused parts of the ribbon to the faded parts, and also dissolves hardened ink in old ribbons. There is no messing of fingers, since it is not necessary to remove the ribbon from the typewriter or handle it in any way. Ribbons so treated are said to last as long as new ones and may be renewed until the ribbon is worn out. It is adaptable also for multigraphs, adding-machines, check-writers, cash registers, etc.

Chemical-Acid-Waterproof Paint

An enamel finish for protecting wood and metal from the effects of most alkalies and acids, as well as fumes and steam from the processes, is announced by Baer Bros., 438 W. 37th St., New York City. This "Chemical, Acid and Waterproof Paint," as it is called, is recommended for general factory maintenance and exterior as well as interior exposure protection, and can readily be applied on machinery, walls, fire-doors, pipe lines, or on any other type of equipment by either brush or spray.

Paint Cleaner for Walls

An improved paint cleaner for walls, described as "Swish," is announced by Fuld Bros., Balto. It is said to be a ready-mixed dry cleaner which needs no rubbing, rinsing or drying.

New Trade Marks of the Month



382,166. Overland Petroleum Corp., Brooklyn, N. Y.; Aug. 14, '36; lubricating oil; use since Sept. 15, '34.

391,755. Lloyd A. Fry Roofing Co., Chicago, Ill.; Apr. 23, '37; roofing material; use since Feb. 22, '32.

391,834. Geo. Worthington Co., Cleveland, O.; Apr. 24, '37; paints, varnish, shellac, varnish remover, white lead, and putty; use since Sept. 1, '36.

396,557. Bennett, Inc., Cambridge, Mass.; Aug. 19, '37; self-emulsifying degreasing solvents; use since June 18, '37.

393,638. Edwal Labs., Chicago, Ill.; June 4, '37; chemicals and preparations for developing photographs; use since Jan. 1, '33.

397,346. Resinous Products & Chem. Co., Phila., Pa.; Sept. 11, '37; foam preventive agent for paper, glue, soap, casein and similar materials; use since Jan. 9, '32.

398,296. John T. Stanley Co., New York City; Oct. 8, '37; dairy and household cleanser; use since Mar. 24, '36.

398,682. Jadransko Anonimo Drustvo Cement Portland, Solin or Split, Yugoslavia; Oct. 19, '37; Portland cement; use since Nov. 15, '37.

398,879. Albert Howard Stebbins, Jr. (Sterling Labs.), Little Rock, Ark.; Oct. 23, '37; paints, varnishes, lacquers, and paint products; use since Oct. 1, '36.

399,221. American Plastic Corp., San Francisco; Nov. 2, '37; plastic compositions; use since Oct. 18, '37.

399,524. Hans Haag, Berlin, Germany; Nov. 9, '37; preparation for killing animals and plants, disinfectants; use since June 13, '35.

397,401. Crosbie-Sarale, Inc., Richmond, Calif.; Sept. 14, '37; paints, enamels and other paint products; use since Nov. 15, '33.

399,594. Chill Foam Corp. of America, Detroit; Nov. 11, '37; powder for washing filter mass and like materials; use since Oct. 15, '37.

400,714. Harold A. E. Wenger (Regnew Labs.), Madison, Wis.; Dec. 10, '37; insect repellents; waterproofing material for dry flies, and color preservative for fishing rod windings; earliest use since Mar. 12, '36.

400,076. Warr Fire Extinguisher Co., Balto., Md.; Nov. 23, '37; dry powder fire extinguishing compounds; use since Aug. 4, '37.

400,557. "Kleeners" Pty., Ltd., Sydney, Australia; Dec. 7, '37; cleansing and polishing powders for household use; use since Nov. 2, '36.

400,588. Cameo Corp., Minneapolis, Minn.; Dec. 8, '37; household cleanser; use since May 10, '37.

400,665. West Virginia Pulp & Paper Co., N. Y. City; Dec. 9, '37; denatured alcohol for industrial use; use since Aug. 11, '28.

401,377. Carleton Ellis, Montclair, N. J.; Dec. 30, '37; synthetic resin; use since Dec. 10, '36.

401,380. Ensign Products Co., Cleveland, O.; Dec. 30, '37; belt and rope dressing and preserver; use since Nov. 1, '31.

401,477. Fales Chem. Co., Cornwall Landing, N. Y.; Jan. 3, '38; adhesive for securing paper labels, etc., to glass, plastics and other surfaces; use since Sept. 24, '36.

401,576. Mallinckrodt Chem. Wks., St. Louis, Mo.; Jan. 5, '38; industrial and fine chemicals; use since 1892.

401,664. General Chem. Co., N. Y. City; Jan. 7, '38; nitric acid; use since Dec. 2, '37.

401,682. Spra-O-Way Products Co., Seattle, Wash.; Jan. 7, '38; fluid for cleaning fabrics; use since Jan. 28, '37.

401,696. Hilton Ira Jones (Hizone Prods.), Wilmette, Ill.; Jan. 8, '38; morticians fluids and products; use since June 1, '37.

401,961. Termax Co., Minneapolis, Minn.; Jan. 14, '38; insecticide; use since Sept. 15, '28.

401,903. Metallgesellschaft Aktiengesellschaft, Frankfort-am-Main, Germany; Jan. 14, '38; preparations for use as anti-corrosives and for rustproofing; use since 1935.

402,796. Robt. M. Searles (Rust-O-Vac Co.), Phila., Pa.; Feb. 7, '38; liquid rust eliminator and preventive for automobile radiators; use since Jan. 22, '38.

402,734. Master Brands, Inc. (Zoro Co.), Chicago; Feb. 5, '38; paradichlorobenzene; use since Jan. 2, '38.

402,263. Pittsburgh Plate Glass Co., Pittsburgh, Pa.; Mar. 19, '38; paint coating for concrete and like surfaces; use since July 1, 1909.

402,703. Acme Chem. Co., Milwaukee, Wis.; Feb. 5, '38; cleanser for toilets, bath-tubs, sinks, etc.; use since Nov. 22, '16.

402,809. Kletam Mfg. Co., Wilkes-Barre, Pa.; Feb. 7, '38; powdered soap for removing duplicating machine inks from hands; use since June 15, '35.

402,887. E. I. du Pont de Nemours & Co., Wilmington, Del.; Feb. 9, '38; inhibitors for mold growth and bacterial organisms in foods; use since Jan. 26, '38.

403,136. Kelco Co., San Diego, Calif.; Feb. 17, '38; sodium or ammonium alginate for use as thickening ingredient of paints; use since Feb. 5, '38.

403,146. Phosphate Mining Co., N. Y. City; Feb. 17, '38; detergent and cleanser having water conditioning properties; use since Feb. 11, '38.

403,306. Champion Paper & Fibre Co., Canton, N. C.; Feb. 23, '38; light boiling odorizing materials, obtained from paper pulp digesters, capable of imparting an odor to natural or other gases; use since Jan. 14, '38.

403,283. Stanco, Inc., Wilmington, Del., and N. Y. City; Feb. 21, '38; insecticides; use since Apr. 11, '35.

† Trade-marks reproduced and described cover those appearing in the *U. S. Patent Gazettes*, May 24 to June 21, inclusive.

Metal Coating Process

The "stannising" process for coating brass, copper, iron, zinc and other metals with tin is applicable to fabricated articles of the most complicated shapes. The method consists in suspending the articles for a few minutes in an atmosphere of hydrogen and stannous chloride vapor. The articles are washed clean of grease with soap and water or a solvent and suspended at 500-600° C. for a few minutes. In contact with the metal surface the hydrogen reduces the stannous chloride to tin which then alloys with the article. The thickness and the composition of the alloy formed depend upon regulation of the temperature and time of exposure to the "stannising" vapor and upon its proper circulation. The details of the method and a discussion of its mechanism are fully described in Technical Publication A76 of the International Tin Research and Development Council.—*Industrial Chemist*, June, '38, p. 249.



403,355. Atlas Powder Co., Wilmington, Del.; Feb. 24, '38; water-repellent processing fluids and coating compositions for fabrics, yarns, paper; use since Jan. 31, '38.

403,527. Standard Oil Co. of Calif.; Wilmington, Del., and San Francisco; Feb. 28, '38; volatile odorant; use since Feb. 2, '38.

403,667. General Printing Ink Corp., N. Y. City; Mar. 3, '38; metal decorating and paper lithographic inks; use since Sept. 3, '37.

403,694. Keasbey & Mattison Co., Ambler, Pa.; Mar. 4, '38; asbestos cements, asbestos papers and other asbestos products; use since June, 1937.

403,698. Ko-Nay Products, Los Angeles, Calif.; Mar. 4, '38; nicotine stain remover; use since Feb. 26, '38.

403,762. Fink-Roselieve Co., N. Y. City; Mar. 7, '38; photographic chemicals; use since Mar. 1, '38.

403,857. Frund Prods. Co., Chicago, Ill.; Mar. 2, '38; plastic rubber for mending rubber, leather, etc., and for making molds, packing, insulation, etc.; use since Nov. 11, '37.

403,904. Jas. B. Borland, Bloomington, Ind.; Mar. 10, '38; cleaning and washing powder compound; use since Sept. 1, '37.

403,923. Jos. A. Schmidt (Schmidt & Co.), West Allis, Wis.; Mar. 10, '38; wax for dance floors; use since Sept. 1, '37.

404,105. Atlas Chemical Co., Marietta, O.; Mar. 16, '38; metallic radiator cement; use since Oct. 1, '37.

404,135. Howard E. Pillsbury, Newburyport, Mass.; Mar. 16, '38; soap, washing powder and hand cleaning paste; use since Feb. 21, '38.

404,156. Arthur Jay Woodward (Glastic Glass Cement Mfg. Co.), Los Angeles, Calif.; Mar. 16, '38; glass cement; use since Jan. 1, '33.

404,289. Chas. W. Berg (Fairchild & French), Phila., Pa.; Mar. 21, '38; laundry and household cleaner having water softening properties; use since Mar. 2, '38.

404,321. Harold Weed McCulloch, Belleville, N. J.; Mar. 21, '38; detergent for washing and cleaning glass, porcelain, paint, varnish, and other finished surfaces; use since Feb., '37.

404,425. R. T. Vanderbilt Co., N. Y. City; Mar. 23, '38; zinc dibutyldithiocarbamate, with a non-volatile organic amine and a neutral or alkaline mineral, used as rubber vulcanization accelerator; use since Feb. 23, '38.

404,542. Phosphate Mining Co., N. Y. City; Mar. 26, '38; fertilizer and fertilizer materials; use since Mar. 17, '38.

404,577. Monsanto Chem. Co., St. Louis, Mo.; Mar. 28, '38; insecticides, germicides, etc.; use since Apr. 2, '36.

404,464. Vernon J. Billimack, St. Louis, Mo.; Mar. 25, '38; roach or lice destroyer; use since Mar. 17, '38.

404,681. Michael P. Barr, N. Y. City; Mar. 31, '38; insecticides; use since Mar. 28, '38.

404,784. Tex-Ite Products Corp., Brooklyn, N. Y.; Apr. 1, '38; concentrated lye, drain solvent, borax, washing soda; use since Sept. 1, '26.

404,861. Miami Chem. Mfg. Co., Miami, Fla.; Apr. 4, '38; bleach and sterilizer; use since Dec. 29, '34.

404,893. General Dyestuff Corp., N. Y. City; Apr. 5, '38; product for improving light fastness of dyeings; use since June 18, '28.

404,983. General Chem. Co., N. Y. City; Apr. 7, '38; compound for use in manufacture baking powder and self-rising flour; use since Feb. 16, '38.

404,984. General Chem. Co., N. Y. City; Apr. 7, '38; compound for use in manufacture baking powder and self-rising flour; use since Feb. 16, '38.

404,985. General Chem. Co., N. Y. City; Apr. 7, '38; fluxing compound; use since Feb. 26, '38.

404,986. General Chem. Co., N. Y. City; Apr. 7, '38; reducing agent for textiles and other materials; use since Feb. 24, '38.

404,998. Theresa McCarthy (Do-All Co.), Elmira, N. Y.; Apr. 7, '38; bleaching, disinfecting, deodorizing compound, having also cleansing properties; use since Mar. 19, '38.

405,002. Taylor, Lowenstein & Co., Mobile, Ala.; Apr. 7, '38; turpentine, gum spirits of turpentine; first use since Sept. 23, '37.

405,071. Huttig Sash & Door Co., St. Louis, Mo.; Apr. 9, '38; liquid wood preserving substance; use since Mar. 22, '38.

405,136. Shawinigan Products Corp., N. Y. City; Apr. 11, '38; polyvinyl acetate resins; use since May 20, '36.

405,137. Shawinigan Products Corp., N. Y. City; Apr. 11, '38; polyvinyl acetate resins; use since Sept. 21, '37.

405,168. Loeser Lab., Inc., N. Y. City; Apr. 12, '38; stable organic mercury compound and potent bactericide, and alcohol and acetone solution used as a germicide; use since Mar. 30, '38

405,206. Humble Oil & Refining Co., Houston, Tex.; Apr. 13, '38; coatings, thinners, primers, reducers, and oils; use since Jan. 25, '38.

405,227. Universal Utility Co., Gloversville, N. Y.; Apr. 13, '38; liquid glass cleaner; use since Apr. 6, '38.

405,252. R. M. Hollingshead Corp., Camden, N. J.; Apr. 14, '38; varnish stain, fillers, lacquers and other paint products, cleaning and polishing materials; use since May 16, '34.

405,253. R. M. Hollingshead Corp., Camden, N. J.; Apr. 14, '38; cleaning and polishing materials in paste, liquid, powder and solid form for all surfaces; use since May 16, '34.

405,254. R. M. Hollingshead Corp., Camden, N. J.; Apr. 14, '38; adhesives, cements, and glues, use since May 16, '34.

405,260. Lin-Tox Corp., Port Chester, N. Y.; Apr. 14, '38; insecticides; use since Dec. 1, '37.

405,285. Atlas Powder Co., Wilmington, Del., Apr. 15, '38; hand cleaners; use since Mar. 7, '38.

405,422. Standard Oil Co. of Calif; Wilmington, Del., and San Francisco; Apr. 18, '38; denaturants, gas odorants, spray oil for insecticidal and fungicidal purposes, and similar products; use since Aug. 1, '30.

405,440. Ensign Products Co., Cleveland, O.; Apr. 19, '38; rope dressing and preserver; use since Mar. 15, '37.

405,479. Andrew Brown Co., Los Angeles, Calif.; Apr. 20, '38; lacquers and enamels; use since Apr. 1, '38.

406,678. American-British Chem. Supplies, N. Y. City; Mar. 31, '38; fluxes; use since Mar. 7, '38.

405,489. Durand & Huguenin A. G., Basel, Switzerland; Apr. 20, '38; auxiliary products or assistants for mordanting, fixing, dispensing, softening in dyeing and printing textiles; use since Jan. 1, '38.

405,495. General Printing Ink Corp., N. Y. City; Apr. 20, '38; preparation used in lithographic processes; use since Apr. 7, '38.

405,529. Patterson O. Stewart, (Electro Products Co.), N. Y. City; Apr. 20, '38; solvent for dissolving sludge and gums formed by oils; use since Jan. 28, '38.

Of special interest to manufacturers of inexpensive metal articles is the newly developed "Goldglo" imitation gold plate, which is now being placed on the market by Special Chemicals Corp., 30 Irving pl., New York. Developed to meet the need for a low cost finish that has the appeal of the rich warm beauty of gold, the makers claim that Goldglo's 18 kt. color is rivalled only by actual gold.



"ANYONE CAN HOLD THE HELM WHEN THE SEA IS CALM"

ANOTHER maxim from the pen of Publius Syrus that has its application in today's economic scheme.

With the outlook far from calm and industry wallowing in the trough of inactivity, it is well to place your chemical orders with a company that is steering a true course.

Rather than sit back and let events shape its future, the A. E. Starkie Company is constantly progressing. The recent enlargement of our Clearing, Illinois, plant and our appointment as sole agents for the Utah Gilsonite Company are just two points in an extensive expansion program.

If you feel slightly despondent over present conditions, you can bolster your confidence by dealing with a young, progressive company such as A. E. Starkie Co.

STARKIE BINDER A Pure Synthetic Pitch • ASPHALT • GILSONITE • VEGETABLE OILS • VEGETABLE AND ANIMAL FATTY ACIDS • NAPHTHENIC ACIDS • STEARIC ACID • ASBESTOS FIBRES • CAROB FLOUR • BENTONITE • DIATOMACEOUS EARTH

A. E. STARKIE CO.

1645 S. KILBOURN AVE. CHICAGO, ILLINOIS

Standard
BICHROMATES

BICHROMATE OF SODA
BICHROMATE OF POTASH
CHROMATE OF SODA



PRIOR CHEMICAL CORP.
420 LEXINGTON AVENUE • NEW YORK
Sole Selling Agents for
STANDARD CHROMATE DIVISION
Diamond Alkali Company, Painesville, Ohio

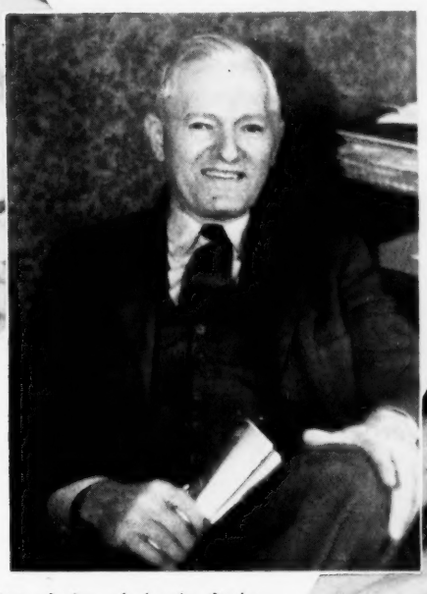
Specialists in Specialties

Constant A. Benoit, Permatex, spotting the high points of his next nation-wide sales campaign on the famous Permatex line of automotive specialties, trained as a chemist at Brooklyn Polytechnic, did three years' research work in the textile field, and since 1921, president, Permatex Co., an inventor in his own right of a plastic form of gasket; member, Inter-American Commercial Arbitration Commission, takes moving pictures, plays golf, and collects stamps.





Perce Bowen, president, Becker-Moore Co., whose headquarters (which come close to being wood flour headquarters for the country) are on an island in the Niagara River, off North Tonawanda, N. Y.



Out of the wholesale florist business, eight years ago, came H. H. Slocombe with a German formula for a neutral Bakelite base, to improve and make standard paints waterproof, and he is now president of the Staminite Corp., New Haven.

Tanning specialties, synthetic and natural, are the specialty of the Buffalo Extract and Supply Co., whose chief specialist is W. C. Beier (below).





In 1907, at Harrison, N. J., the National Oil Products Co. was organized, first to sell lubricants, but quickly expanded to sulfonated and other treated oils, and has since branched out into the vitamin field. Last year company opened a new model plant, at Cedartown, Ga., especially to handle their wide line of specialties designed for the textile field. Secretary of this company, one of the prime movers in its progress, and director of its efficient sales force, is G. D. Davis.



Bartlesville, Okla.—Covering 25,000 square feet and housing a staff of 93, the new Phillips Petroleum Company's research laboratories were opened recently, direct successor of four small rooms and staff of eight which initiated the research activities of this corporation thirteen years ago.



All of Merck & Company's acids and ammonia are now shipped in their recently perfected "Pour-clean" bottle with a drip-proof lip and a plastic screw closure, inside which is anchored a lining of impregnated glass cloth. These bottles are now shipped in a new hinge-top case, ten pounds lighter.

Long Island City, N. Y.—A permanent packaging and machinery exhibit of containers made of paper or Cellophane, used as wrappings and as bags, has been opened at 31st Place and 48th Avenue by the Amsco Packaging Machinery, Inc., where machines can be seen and demonstrated, and new ideas in packaging examined.



Research never stands still!



*Pentasol (Pure Amyl Alcohol)
*Pent-Acetate (100% Amyl)
Normal Butyl Carbinol
Isobutyl Carbinol
Sec-Butyl Carbinol
Methyl Propyl Carbinol
Diethyl Carbinol
Dimethyl Ethyl Carbinol
Tertiary Amyl Alcohol
*Pentaphen
(p-Tertiary Amyl Phenol)
Diamyl Phenol
Ortho Amyl Phenol
Monoamylamine
Diamylamine
Triamylamine
n-Monobutylamine
n-Dibutylamine
n-Tributylamine
Monoamyl Naphthalene
Diamyl Naphthalene
Polyamyl Naphthalenes
Mixed Amyl Naphthalenes
Normal Amyl Chloride
Normal Butyl Chloride
Mixed Amyl Chlorides
Dichloropentanes
Amyl Mercaptan
Diamyl Sulphide
*Pentalarm
Amylenes
Diamylene
Amyl Benzenes
Diamyl Ether
SEMI-COMMERCIAL PRODUCTS
LABORATORY PRODUCTS
*Trade Mark Registered

Like time and tide, research is restless. It moves on and on, reaching out for objectives beyond the average vision—for results that only the chemist can anticipate and achieve.

On its tireless march through the uncharted paths of chemical reaction and process building, Sharples Synthetic Organic Chemicals are serving industrial research as "starting points" in complex syntheses—as dependable reagents in simplifying reactions, perfecting formulations, and developing new and profitable products.

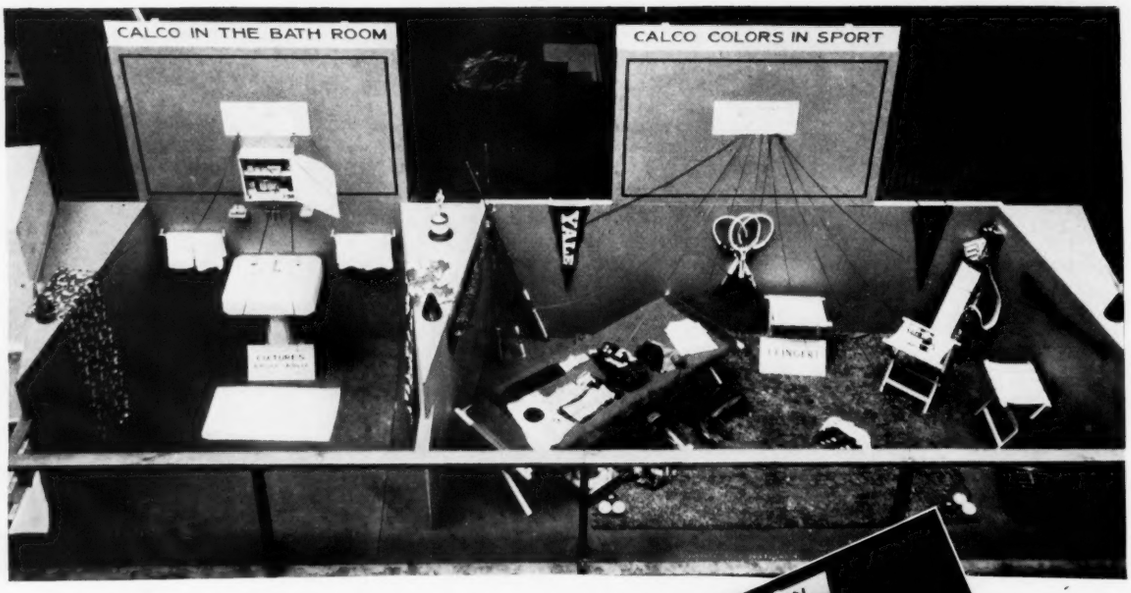
A study of this list of Sharples Organic Chemicals has indicated to many a research man the correct solution to a troublesome process problem. Almost 3000 technical directors already have secured copies of the new 64-page Booklet describing these Sharples Chemicals. Why not write for yours today?



SHARPLES SOLVENTS

THE SHARPLES SOLVENTS CORP., 23rd and Westmoreland Streets, Philadelphia, Pennsylvania

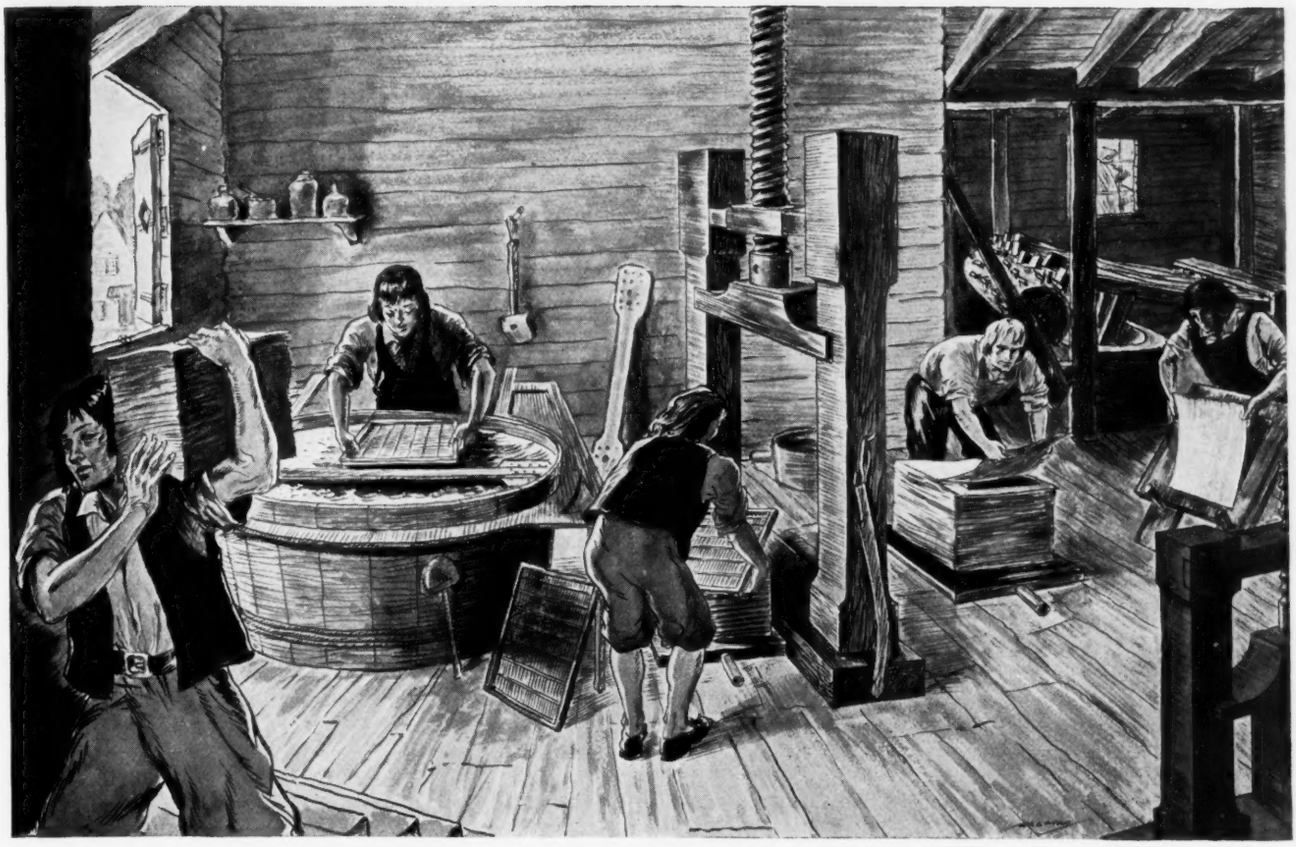
CALCO Gives a Party





When Somerset Co., N.J., celebrated its 250th birthday, Calco held open house and over 2,000 of its neighbors were piloted by forty guides, taking groups through the azo plant, the paper and research laboratories, accounting department, ending at an exhibit, in the Maintenance Building, of Calco products in everyday life.





Through The Centuries With Alkalies

The first paper mill in this country was built in 1690 at Germantown, Pa. resulting from the needs of the Philadelphia printer William Bradford and the arrival of the German paper maker, William Rittenhouse. In paper making, soda ash and caustic soda have long played a prominent part. Bleaching thru the use of liquid chlorine, another alkali product, is largely responsible for the tremendous revolutionary advance in the use of wood pulp for paper manufacture.

COLUMBIA Soda Ash and COLUMBIA Caustic Soda are leading COLUMBIA products which have long been regarded as the standard of uniformity and purity. Both products are obtainable in forms and packages adapted to meet the varied needs of the many industries using soda. COLUMBIA Chlorine, too, is produced under conditions and control which assure the consumer full strength, purity and uniformity.

Information about any or all of COLUMBIA products on request.



COLUMBIA

SODA ASH
CAUSTIC SODA
SODIUM BICARBONATE
MODIFIED SODAS
LIQUID CHLORINE
CALCIUM CHLORIDE

THE COLUMBIA ALKALI CORPORATION
BARBERTON • OHIO

NEW YORK
ST. LOUIS
CLEVELAND
CHICAGO
PITTSBURGH
MINNEAPOLIS
BOSTON
CINCINNATI
PHILADELPHIA



Colloidal Chemistry

Early dyers unwittingly utilized colloidal chemical principles in plying their art. In recent years colloidal chemistry has been applied to many industrial processes, with the result that today colloidal phenomena are encountered in such diverse industries as metallurgy, paper, glass, rubber, cements, ceramics, beverages, cooking, paints and many others.

Mallinckrodt TANNINS

MALLINCKRODT TANNIC ACID
MALLINCKRODT GALLIC ACID
MALLINCKRODT PYROGALLIC ACID

Mallinckrodt Tannins are being increasingly used in many of these industries as colloidal reagents. They are highly refined and purified products made in grades ranging from technical to analytical quality. They have solved unusual problems in many industries. If you are interested in these materials write for prices and samples.

ATTENTION AMATEUR PHOTOGRAPHERS!

If photography is your hobby, write for special information about Mallinckrodt photographic chemicals.

Mallinckrodt Industrial-Pharmaceutical Price List on Request



Mallinckrodt
CHEMICAL WORKS

2nd & Mallinckrodt Sts.
ST. LOUIS, MISSOURI

72 Gold Street,
NEW YORK, N. Y.

CHICAGO

PHILADELPHIA

TORONTO MONTREAL

A. E. MORGAN FILES SUIT

Former TVA Chairman Challenges Right of President Roosevelt to Remove Him—Biddle Appointed Chief Counsel for Joint Congressional Committee Investigating TVA—Pope Committee, Studying Nation's Phosphate Resources, Starts Work—

Dr. Arthur E. Morgan filed suit in Knox County Chancery Court on July 6 challenging the right of President Roosevelt to remove him as chairman of the TVA and asking that he be recognized as a member and chairman of the board of directors of the agency.

He asserted in the bill that he had never recognized the President's right and power to remove him as chief of the New Deal's great experiment in social and economic planning.

He asked payment of back salary since his removal by the President March 22 and a declaratory judgment voiding Mr. Roosevelt's removal order and forcing Directors H. A. Morgan and David E. Lilienthal to recognize him "as a member and chairman of the board of directors of the defendant, Tennessee Valley Authority."

The bill named the TVA and Directors Harcourt A. Morgan and Mr. Lilienthal as defendants.

Biddle—Chief Counsel

Francis Biddle of Philadelphia has been appointed chief counsel for the joint congressional committee investigating TVA. He was chairman of the National Labor Relations Board in 1934-35. In 1913 he became secretary to the late Justice Oliver Wendell Holmes of the U. S. Supreme Court, and from 1922 to 1926 was special assistant U. S. District Attorney for the Eastern Pennsylvania district. At one period there was considerable speculation as to whether the post would be offered to Samuel Seabury, famed for his investigation of the Walker Administration in N. Y. City. The opening session of the TVA investigating committee has not as yet been officially disclosed.

Investigation of Phosphate Resources

The joint Congressional committee appointed by the President to investigate the Nation's phosphate resources and to make recommendations concerning their conservation began its public hearings in Washington, June 18. At the opening of the hearings Senator Pope of Idaho, chairman of the committee, outlined the purpose of the investigation, stressing the importance of phosphates to the national welfare and the need for conservation of our resources.

The first witness was Secretary of Agriculture Wallace, who stated that although our supplies are very great our losses are also very great and that it is high time that we give serious consideration to the matter. Last year, according to the Secretary, AAA purchased 25,000 tons of concentrated superphosphate from TVA to use in the soil conservation program, but this year requests from farmers will likely total 60,000 to 70,000 tons, making it necessary to obtain about 35,000 tons from commercial sources. Dr. Harcourt A. Morgan, Chairman of TVA, who followed Secretary Wallace, reviewed our past losses of phosphates and the need for increasing our use of phosphate. If our soils are to be kept at their present level of fertility, our consumption of phosphates must be increased 10 times, in the opinion of Dr. Morgan.

Dr. Harry A. Curtis, Chief Chemical Engineer of TVA, discussed the work being done by that organization in the development of concentrated superphosphate, now being produced at the rate of 5,000 tons a month. Calcium metaphosphate is being produced at the rate of 32 tons a day. Others heard last month included Dr. Henry G. Knight, chief of the Bureau of Chemistry and Soils, Dr. George R. Mansfield of the U. S. Geological Survey, Dr. John W. Finch, chief of the Bureau of Mines, Paul M. Tyler of the Bureau of Mines, and W. R. Ogg of the American Farm Bureau Federation who endorsed TVA and recommended that its fertilizer program be expanded nationally.

Stop Further Leases

Prohibition of further leases of phosphate lands in the public domain was called for in a resolution adopted unanimously on June 21 by the joint Congressional committee. The resolution, calling on General Land Office officials to take such action until the committee completes its investigation, was offered by Rep. Charles H. Leavy (Dem., Wash.).

The committee will reconvene in Pocatello, Idaho, on July 20, in order to get first-hand knowledge of the western phosphates. Representatives of various organizations interested in the development of the Idaho reserves have been invited to appear. During the fall the committee will visit the TVA plants and the Tennessee and Florida mines. It is expected that representatives of the mining companies will testify at the Tennessee and Florida hearings. Mr. Brand, executive secretary of the National Fertilizer Association, will present the general fertilizer industry viewpoint at some future hearing.

Members of the committee are: Senators Pope of Idaho, Chairman; Norris of Nebraska; and Pepper of Florida; Representatives Peterson of Florida, Leavy of Washington; and Case of South Dakota.

Chemical Industry Expanded Rapidly In '37

Review of World Developments by the Chemical Division of the Commerce Dept. Reveals Strong Nationalistic and Rearmament Programs Encouraged Expansion of Facilities in Foreign Countries—

Expansion of production facilities, the inauguration of new industries, stocking for emergencies, and governmental interest in chemical manufacture were outstanding features of world chemical developments in 1937, according to a world survey of the chemical and allied products industry made available by the Commerce Dept.'s Chemical Division.

The chemical industry of the world during 1937 continued the progress made in the preceding years; there was considerable improvement in the financial condition of the chemical industry which in many countries recorded the most prosperous year since 1929, the survey shows.

Strong nationalistic and rearmament programs encouraged the rapid progress of manufacture of chemical products, especially in European countries, notwithstanding that sometimes these new industries were uneconomic. The industry on a few occasions for short periods was hampered by interruption of raw material supplies by conditions existing in supplying countries, but at no time was the condition serious.

Foreign chemical trade in 1937 considerably exceeded preceding years and was the largest since 1929; the loss or reduction of purchases in certain regions was more than offset by increased purchases in other countries.

In South America, the chemical market was influenced less by these events than elsewhere, though competition from certain European countries was keener and the almost world-wide self-sufficiency movement was evident in the area.

Accentuated rearmament programs continued in almost all European countries and brought about increased production and demand for many chemical products. The peak at which iron and steel industries operated was reflected in increased output of co-products.

The continued civil war in Spain reduced chemical exports from European suppliers to that country and caused them to seek foreign outlets elsewhere, as well as to look for new sources of supply for certain raw materials formerly supplied by Spain. Despite conditions in Spain, however, that country exported 2,292,000

metric tons of pyrites last year, against 1,985,000 tons in 1936. The withdrawal of Spanish potash from world markets was automatically taken care of by the International Potash Cartel.

Italy reentered world chemical markets with products which had been temporarily withdrawn during the Ethiopian campaign. An outstanding effect, so far as the U. S. is concerned, was the resumption of Italian sulfur shipments to markets which obtained their sulfur requirements from the U. S. during '36.

Disorganization in Far East

In the Far East, the Sino-Japanese situation tended to disorganize trade in that region during the latter part of the year and resulted in much of Shanghai's normal business being rerouted through Hong Kong. Despite these conditions, however, China was able to export an all time record quantity of tung oil to world markets, particularly to the U. S., its leading foreign market for this essential raw material. In most European countries and in Japan there was almost complete control of foreign trade in one way or another, but imports of essential raw materials were, in most cases, admitted freely. No significant changes were reported in connection with the large international cartels, such as those controlling international movements of nitrogen, potash, chlorates, dyes, sodium sulfate, alkalies, calcium carbide, cyanides and certain fine chemicals.

It would be impossible to make an exhaustive study of every country, hence the selection in this bulletin is based on the significance of the industry within the country, the importance of the country as a market for American chemicals, or the advent of chemical manufacturing.

The Survey *World Chemical Developments in 1937*, known as Trade Promotion Series No. 177, can be obtained from the Superintendent of Documents, Washington, D. C., or from any of the Dept.'s District Offices, located in the principal commercial centers of the country, at 25c per copy.

430 Attend Fertilizer Convention

Wright Suggests Soil Improvement Work, Fair Trade Practice in Marketing, Better Handling of Public Relations—Brand Denies Need of Large Scale Fertilizer Production by TVA—

The 14th Annual Convention of the National Fertilizer Association, held June 6, 7, and 8 at the Greenbrier, White Sulphur Springs, W. Va., attracted 430, an attendance slightly less than last year when 446 were present. The list in 1936 totaled 401; in 1935 it was 461; and in 1934 it was 412.

At the meeting of the board of directors held on Wednesday, June 8, following adjournment of the convention, the following officers of the Association were reelected for the coming year: W. T. Wright, Norfolk, Va., president; Henry S. Parsons, N. Y. City, vice-president; and Charles J. Brand, Washington, D. C., executive secretary and treasurer.

The first general session of the convention held on Tuesday morning, June 7, was opened with the annual presidential address by Mr. Wright. "There are three industry helps," said Mr. Wright, "of such outstanding importance I would bring them to your attention and express the sincere hope we will not greatly err in their handling: 1. Adoption of aggressive soil improvement work. 2. Enforcement of sound fair trade practice rules in marketing. 3. Intelligent handling of public relations. A historical review of the good years our industry has enjoyed proves the absolute necessity of intelligent handling of these three industry helps.

"About soil improvement work, there is much misunderstanding—even as to the meaning of the words. My conception of the meaning is any educational work which promotes an increased or more intelligent use of our product for the benefit of our customers—the farmers. The opening sentence of President Roosevelt's recent message to Congress on phosphorus illustrates the need for such work better than any words I can use. He said, 'the soil of the U. S. faces a continuing loss of its productive capacity.'" Mr. Wright stated that we all know that statement is true and that it is essential that we rebuild soil fertility.

Speaking of fair trade practices, Mr. Wright said that the only years since the war when the fertilizer industry has prospered have been those when the industry intelligently planned and sincerely adopted what were considered legal and practical fair trade practice rules to govern sales operations. "It is quite essential, not only to our industry but to the public," he said, "that sound and constructive fair competitive trade practices be fostered in the sale of our product."

Regarding public relations, Mr. Wright said, "Too few members of our industry are familiar with the public relations questions constantly arising in Washington, and, therefore, are unable to appreciate fully the work being done by our staff, which avoids industry trouble and attack. Many are inclined to be too militant in our public relations work, others would pussy-foot. There is a middle-of-the-road course of diplomacy which I would advocate. That course means fight vigorously and aggressively when we are attacked, but don't permit a militant attitude to spot us for attack."

The eleventh annual dinner of the Association was held Tuesday evening, June 7. President W. T. Wright presided. Special guests of the Association who were introduced by Mr. Brand were: D. S. Coltrane, assistant to the Commissioner of Agriculture, Raleigh, N. C., and Mrs. Coltrane; Felix Stapleton, U. S. Tariff Commission, Washington, D. C., and Mrs. Stapleton; Dr. C. H. Kunsman, chief of Fertilizer Investigations, U. S. Dept. of Agriculture, Washington, D. C.; J. W. Wizeman, Chemical Division, Bureau of Foreign and Domestic Commerce, Dept. of Commerce, Washington, D. C.; M. H. Snyder, in charge of laboratories, State Dept. of Agriculture, Charleston, W. Va.; H. B. McClung, chemist, State Dept. of Agriculture, Charleston, W. Va.; and Mrs. Sarah K. Thompson, chemist, State Dept. of Agriculture, Charleston, W. Va. Following the dinner Mr. Wright introduced Harry K. McEvoy, who entertained with stories and sleight-of-hand.

"Of Soils and Crops and Men"

The Wednesday program opened with an address by Mr. Brand entitled, "Of Soils and Crops and Men." He commended the chemical and agronomic research work of the Government, particularly that of the U. S. Dept. of Agriculture, and held unnecessary the work of the TVA in the field of large-scale fertilizer production and distribution.

TRADE BY COUNTRIES IN CHEMICALS AND ALLIED PRODUCTS[1]

Country	Imports				Exports			
	Metric tons		Thousands of francs		Metric tons		Thousands of francs	
	1936	1937	1936	1937	1936	1937	1936	1937
Germany	87,619	106,925	227,652	254,814	484,121	669,469	158,489	202,791
Austria	437	385	2,665	3,141	4,450	6,261	3,221	3,792
Spain	9,649	47	10,425	685	29,764	18,584	23,323	33,681
France	425,284	447,149	304,638	335,545	224,211	257,224	156,496	194,265
Italy	349	954	1,555	7,576	6,265	20,546	7,216	27,239
Norway	12,259	4,110	8,748	4,049	27,868	23,189	13,576	14 051
Netherlands ..	65,909	66,198	58,455	65,270	614,715	639,666	226,593	239,953
Poland	6,192	4,829	4,945	5,130	42,522	72,764	14,442	26,972
Portugal	408	544	223	614	29,405	36,882	21,676	30,969
United Kingdom	11,067	16,893	43,944	49,836	86,489	79,532	121,779	121,154
Sweden	1,262	1,096	4,012	5,133	111,830	131,351	52,850	69,479
Switzerland ..	1,140	1,349	36,338	37,428	27,963	25,937	20,057	23,022
Japan	3,904	1,478	8,170	5,996	58,876	54,968	50,594	49,282
United States..	16,788	10,585	56,120	61,754	133,574	166,874	128,737	163,819

[1] Preliminary and incomplete statistics.

H. M. Hooker Elected President

Edwin R. Bartlett Now Vice-President of Hooker Electrochemical Co.—Robertson, Turner, and Rowe Elected Directors of Titanium Pigment—Personnel Notes—

Harry M. Hooker is the new president of Hooker Electrochemical Co., succeeding his brother, Elon H. Hooker, who died on May 11.

Mr. Hooker was born July 18, 1874, at Rochester, N. Y. Following graduation from the University of Rochester in 1894, he was engaged in construction work for some years, later joining the contracting firm of H. B. Hooker & Son, headed by his father.

In '13 he joined Hooker Electrochemical, headed by Elon H. Hooker, as superintendent of construction in connection with an enlargement of the plant at Niagara Falls. After the completion of this work he remained with the company as an executive in the research department. In 1921 he was transferred to New York as sales manager, and in 1922 was elected a vice-president.

Mr. Hooker is a director and secretary of the United States Alkali Export Association and a director of the Chlorine Institute.

Edwin R. Bartlett, one of the pioneers of the Hooker Electrochemical Co., has been elected vice-president and treasurer. He became associated with the Development and Funding Co. in '07 and continued when the Hooker organization was formed two years later. He started as a timekeeper and worked his way up through the company, being at various times, purchasing agent, office manager, assistant superintendent, superintendent. Mr. Bartlett was graduated from Dartmouth in '04.

Titanium Pigment Elects

At the annual meeting of stockholders of Titanium Pigment Corp., held June 6, at Sayreville, N. J., D. W. Robertson, J. L. Turner and Harold Rowe were elected members of the board of directors to fill the vacancies caused by the recent death of E. J. Cornish and by the resignations of R. M. Roosevelt and W. F. Washburn. Charles Simon was also elected a director to occupy a previously unfilled vacancy.

D. W. Robertson, general sales engineer, was elected vice-president of the corporation at a subsequent meeting of the board of directors. Mr. Robertson has been associated with Titanium Pigment since 1926.

Others in New Posts

The Eagle-Picher Sales Co., Cincinnati, has elected William H. Hayt and Miles M. Zoller vice-presidents. Mr. Hayt is general manager of the white lead division, and Mr. Zoller general manager of the pigment division of the organization.

Pfaltz and Bauer, Inc., Empire State Bldg., N. Y. City, announce that Frank L. Caron is now associated with them in their chemical sales division. Mr. Caron, a graduate of Massachusetts State College, was formerly with J. T. Baker Chemical as N. Y. representative. Company also reports that Arthur Smith, a graduate of M. I. T., is now in the chemical sales division.

Howard V. Smith, of El Dorado, Kans., has been appointed chief chemical engineer of the Barber Asphalt Corp., in charge of the company's technical department. For the last eleven years Mr. Smith has been assistant superintendent of the El Dorado refinery of Skelly Oil. He is a graduate of the department of chemical engineering of the University of Kansas. J. Strother Miller, Jr., formerly director of the technical department of Barber Asphalt has been advanced to be technical adviser to the company.

Obituaries

Harold J. Rolls died June 8 at his home in Buffalo after a year's illness. A resident and active citizen of Buffalo for 29 years, Mr. Rolls had been closely identified with the social and commercial activities of this section.

Coming to Buffalo from England in 1909 at the age of 20 he was first employed by Spencer Kellogg & Sons Co. where he won advancement in a short time to the post of purchasing agent. Shortly thereafter he decided to forsake the role of a buyer for that of a seller and established a business in his own name as a distributor of raw materials for industrial use. This business subsequently became The Rolls Chemical Co. which he headed at the time of his death.

He was an officer of several organizations during his life in the community. Among them were the Rotary Club, the Buffalo Chamber of Commerce and the Buffalo, Paint, Oil & Varnish Association. He was formerly an active participant in the affairs of the Saddle and Bridle Club and the Park Club and was a charter member of the Buffalo Athletic Club. He was active in Masonic circles and a member of St. Paul's Episcopal Church. In addition to his interests in horses and golf, his avocations included dramatics and drawing, in which fields he had developed unusual amateur ability.

Travel had always held a fascination for him, and he made several trips to England and the Continent in recent years. On his last trip to the land of his birth he completed a lifelong ambition: He covered on foot the "Pilgrims' Way" from Winchester to Canterbury which was trod by the supplicants of the Middle Ages.

Mr. Rolls is survived by his wife, Helene, of Buffalo, and by his father and two brothers, residents of Toronto.

Benjamin D. Beyea

Benjamin D. Beyea, 49, assistant to the president of E. I. du Pont de Nemours & Co., died June 14 in a Wilmington hospital following an operation on June 4 for appendicitis. He joined the du Pont organization at the end of the World War, first serving as a commercial investigator in the development department. He was appointed as assistant to President Lammot du Pont last year.

Albert P. Axtell

Albert P. Axtell, 47, former vice-president of Chilean Nitrate Sales, died June 14 at his home in N. Y. City. He had been ill for several years. Mr. Axtell was born in Jacksonville. For many years he was associated with du Pont in the traffic department at Wilmington in charge of chartering bottoms for the transportation of Chilean nitrate. He left du Pont to become manager of the nitrate department of Wessel, Duval & Co., and subsequently joined Anglo-Chilean Nitrate in charge of nitrate sales in the U. S. Surviving are his widow, Bertha Axtell, a son, Reginald, and two daughters, Alberta and Florence.

J. N. Compton

J. N. Compton, 44, chief engineer at Carbide and Carbon Chemicals, Charleston, W. Va., plant, died June 14 at his home of heart disease after an illness since last April. He was a native of Evansville, Ind. He had not worked at the plant for the last several months because of poor health.

Mr. Compton had been connected with the company since 1915. He had been employed at the South Charleston plant since 1924. He worked at the Clendenin plant from 1920 until 1924.

Other Deaths of the Month

Jackson B. Ashley, vice-president and assistant general manager of the Coffin-Redington Co., well-known San Francisco wholesale drug house, died in Fresno, Cal., June 23.

Ellery Lewis Wilson, 57, vice-president, Rumford Chemical, Providence, R. I., died on June 26 in Pomfret, Conn. In addition to being a vice-president he was also general superintendent of the plant.

William M. Matthews, 30, connected with the Brooklyn office of C. K. Williams & Co., died on June 26 from injuries received when he was struck by an automobile on his way to work.

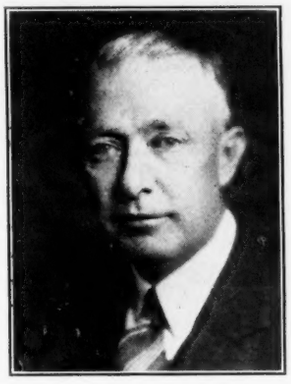
Dr. Beverly T. Galloway, 75, a retired plant pathologist of the Bureau of Plant Industry, died on June 13 in Washington.


STAUFFER
Stauffer
CHEMICALS
LIQUID CHLORINE
Stauffer now has available for immediate delivery Liquid Chlorine shipped in 15 or 30 ton tank cars.
Stauffer Liquid Chlorine is backed by over 50 years experience in the manufacture of chemicals, guaranteeing the highest purity and uniformity.
Let us quote on your next Liquid Chlorine order.
OTHER STAUFFER PRODUCTS
BORIC ACID : CARBON TETRACHLORIDE : BORAX TITANIUM TETRACHLORIDE : SULPHUR : SULPHUR CHLORIDE : SILICON TETRACHLORIDE : CREAM OF TARTAR : SULPHURIC ACID : CAUSTIC SODA : TARTARIC ACID : WHITING : CARBON BISULPHIDE
STAUFFER CHEMICAL COMPANY
624 California St., San Francisco, Cal. ● 2710 Graybar Bldg., New York, N. Y. ● Freeport, Texas ● Rives-Strong Bldg., Los Angeles, Cal. Carbide and Carbon Bldg., Chicago, Ill. ● 424 Ohio Bldg., Akron, Ohio Apopka, Florida
Chemicals

Gulick, Nat. Oil Products, Now Board Chairman

John H. Barton Elected President—Disinfectant Standards Adopted—Also Package Sizes for Agricultural Insecticides—News of the Specialty Companies—

The National Oil Products Co. has announced the election of Charles P. Gulick to the office of chairman of the board at the June meeting of the board of directors. At the same time John H. Barton was elected president of the company, and Thomas Printon, formerly in



CHARLES P. GULICK
Now Chairman of the Board

charge of industrial sales, was elected vice-president in charge of industrial sales. Other officers are Perc Brown, vice-president, G. D. Davis, vice-president, Ralph Wechsler, treasurer, and A. A. Vetter, secretary.

Mr. Gulick stated that the company was expanding its facilities in Harrison, Chicago, Cedartown and elsewhere in anticipation of an increase in its general business. The company manufactures processing chemicals and industrial specialties for use in the processing industries, as well as a varied line of vitamins and vitamin concentrates for the feed, food and pharmaceutical industries.

Disinfectant Standards

The National Bureau of Standards, U. S. Dept. of Commerce, Washington, D.C., announces that signed acceptances have been received representing a satisfactory majority of production and the commercial standards designated as follows may be considered effective beginning June 10, 1938:

Liquid Hypochlorite Disinfectant, CS68-38
Pine Oil Disinfectant, CS69-38
Coal Tar Disinfectant, (Emulsifying Type), CS70-38
Cresylic Disinfectant, CS71-38
Household Insecticide (Liquid Spray Type), CS72-38.

Mimeographed copies of the above commercial standards are now available and will be supplied gratis to those who request them.

Agricultural Packages

The current revision of Simplified Practice Recommendation R41, Package Sizes for Agricultural Insecticides and Fungicides, has been accorded the required degree of acceptance by the industry and became effective June 15, according to the Division of Simplified Practice, National Bureau of Standards. The revised recommendation is identified as Simplified Practice Recommendation R41-38.

This recommendation not only lists the types and sizes of packages for certain items, but also indicates the number of packages to be placed in shipping box. The geographical area, for which each size and type of package is particularly adapted, is also given.

Until printed pamphlets are available, mimeographed copies of this simplified practice recommendation may be obtained without charge from the Division of Simplified Practice, National Bureau of Standards, Washington, D. C.

Peptones for Testing

Dr. George F. Reddish of the Lambert Pharmacal Co., St. Louis, Mo., has issued a statement as chairman of the disinfectants and antiseptics scientific committee of the National Association of Insecticide and Disinfectant Manufacturers, Inc., which has been cooperating with the Armour Laboratories of Chicago in testing different lots of Armour's peptone and selecting from these various lots those peptones best suited for use in testing disinfectants and antiseptics. The new "1938 Project" Armour's Peptone, which has been tested and approved by this committee, is now available. This peptone may be secured direct from Armour and Co., Chicago, or from any scientific supply house. Order should specify "1938 Project Armour's Peptone."

Establishes Prices in Ohio

Colgate-Palmolive-Peet on July 6 established in Ohio minimum retail prices on Super-Suds and Concentrated Super-Suds under that State's Fair-Trade Law. The company recently set minimum prices on Palmolive soap. The new contracts established a minimum of 9c or three boxes for 23c on the regular size Super-Suds and 16c or two boxes for 31c on the giant size. Minimums on Concentrated Super-Suds are 8c or two for 15 for the medium size, and 19c or two for 37c on the large size. Of 250 replies, in a survey which J. A. Reilly, sales manager of the company's soap department, conducted among Ohio retailers, only 16 found fault with some phase of the Fair-Trade Law and all were in favor of the action taken by the company, agreeing that it was a step in the right direction.

News of the Specialties

Bruce Loses du Pont Suit

The Court of Appeals at Jackson, Tenn., on June 10 dismissed the case of E. L. Bruce Co. of Memphis vs. E. I. du Pont de Nemours and Co. and reversed the judgment of the lower court. This action set aside an award of the Shelby County First Division Circuit Court of $64,666.88 against du Pont for damage claimed to have been caused by a chemical preparation used by the Bruce Company in treating hardwoods.

A jury in the lower court first returned a verdict after a 5 weeks' trial of $126,239. Judge Ben Capell reduced it to $64,666.88.

Attorneys for du Pont Company were Longstreet Heiskell of Chandler, Shepherd, Owen and Heiskell, David Ballon and the late Milton J. Anderson of Memphis, and Abel Klaw of Wilmington, Delaware. Canada and Russell, representing the Bruce Company, have 40 days in which to appeal to the State Supreme Court.

Notes of the Companies

Gleam Chemical, Inc., Davenport, Iowa, has established a distributing point in Schenectady, N. Y. Company makes a general line of sanitary supplies. Louis Feigenbaum of Schenectady will be branch manager.

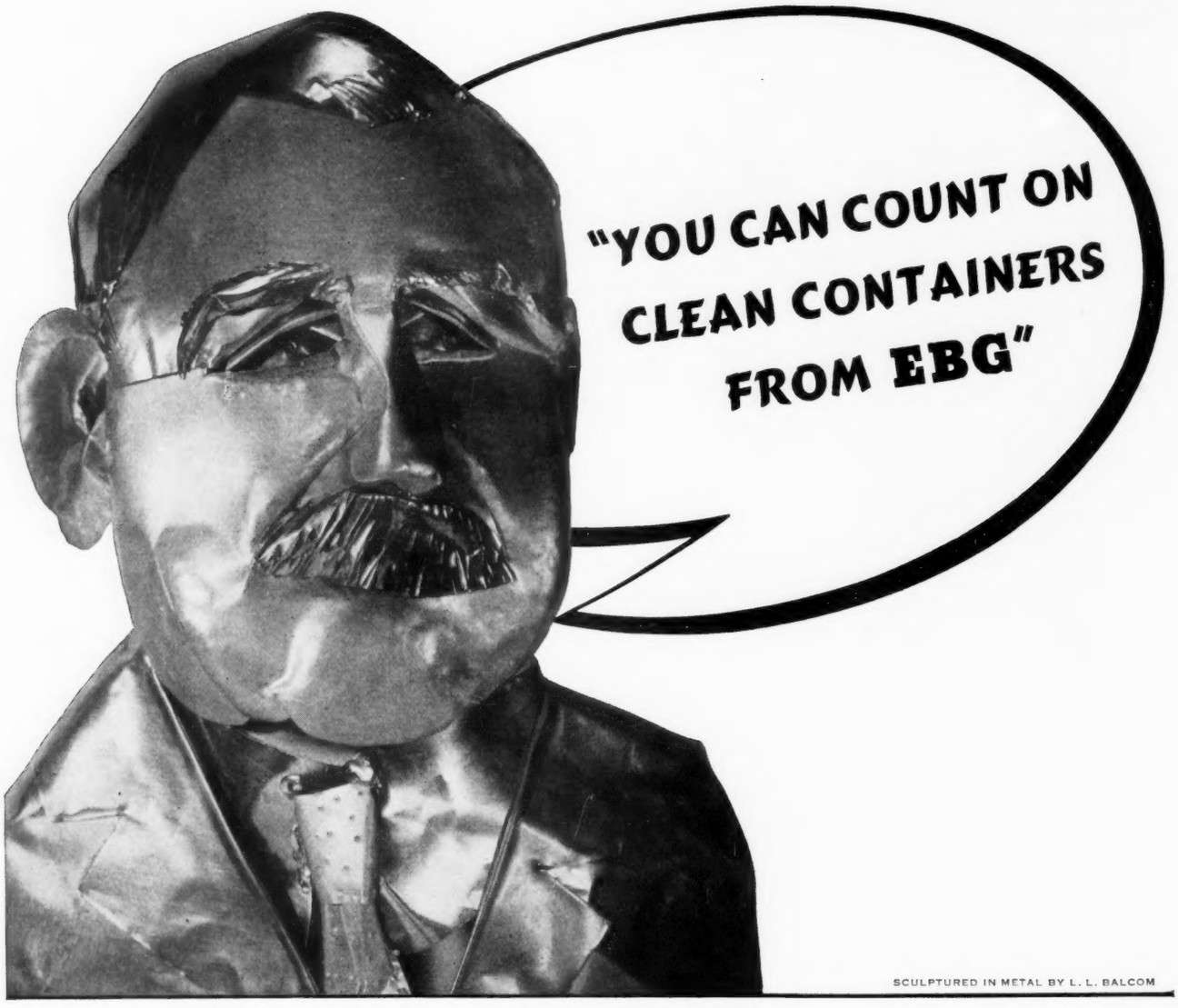
Ace Lacquer & Chemical leases a building at 11-14 33d ave., Long Island City, N. Y. Need for additional manufacturing space forced the move.

Solventol Chemical Products, Detroit, Mich., is planning an intensive cleaning compounds drive in 14 states. Keith Fraser is sales promotion manager of the company. Plans call for adding 50 salesmen to the present force.

The Beacon Co., 89 Bickford st., Boston, Mass., manufacturer of emulsifying waxes, stearates, and a wide variety of chemical specialties, has appointed Gardner Davis, well-known Spokane, Wash., chemical distributor, as its representative in that area.

Proctor Chemical is a new company formed by Edward E. Proctor at Salisbury, N. C., to act as selling agent for several manufacturers of textile chemical specialties. Company plans, however, in the near future to enter the manufacturing field on certain items used in the textile field.

The business of the late C. G. Reichert Chemical Co., Marshfield, Wisc., has been taken over by Arnold O. Beseler. The company has not functioned since Mr. Reichert's death 3 years ago.



● Pure Liquid Chlorine stays pure only when containers are kept immaculately clean and in peak operating condition. That's why EBG has perfected a military-strict system of steaming, washing, air-drying, reconditioning and inspecting all cylinders, drums and tank cars. It is just one of the many precautions we take to assure you a uniform flow of pure gas at all times and a maximum return on your Liquid Chlorine investment.

ELECTRO BLEACHING GAS COMPANY

MAIN OFFICE: 60 EAST 42nd STREET, NEW YORK, N. Y. • PLANT: NIAGARA FALLS, N. Y.

EBG Liquid Chlorine
FIRST IN THE COUNTRY

Heavy Chemicals

Metal Derivatives Advance Sharply

Moderate Improvement in Demand for Industrial Chemicals —Warmer Weather Responsible for Increased Shipments of Ammonia, Chlorine, etc.—Electroplating Chemicals Are Dull —Boric Acid and Borax Advanced $1 a Ton—Alkalies, Bichromates in Moderate Demand—Improved Outlook in Textiles, Paper, and Leather—Glycerine Reduced Sharply—

A decided improvement in sentiment was noted in the markets for industrial chemicals in the final two weeks of the month, and a slight increase in volume of shipments and in the number of inquiries for spot goods was reported. However, the bullish tendencies of the stock and commodity markets were lacking to a large degree, and the industry as a whole still does not believe that business will show any substantial gains until the seasonal upswing in the early fall. Hand-to-mouth purchasing is still the general rule, although in many instances, instructions are being given for rush deliveries, indicating that inventories are at an extremely low and sensitive point.

The sharp advances in copper, tin, lead, and zinc were immediately translated into higher quotations for several of the important metallic salts. On the last day of the month copper was advanced ½c. Copper sulfate was immediately raised 15c per 100 lbs., to a basis of $4.15. The black copper oxide and the red oxide are now quoted at higher levels, the former at 14¼c and the latter at 15¾c. Copper was again advanced in the first week of July to 9¾-10c, and further increases are looked for in the red metal derivatives.

Despite the poor statistical position of tin the price structure firmed up last month in almost unbelievable fashion and carried sodium stannate to 29c, crystals to 34½c, the oxide to 46c, and the tetrachloride to 21¾c.

Somewhat unexpected was the rise of one dollar a ton in the carlot quotations on boric acid and $3 for l.c.l. quantities. Similar increases were announced for borax.

Antimony metal was the one exception in the rising metal markets, and the quotation at the end of June was around the 11¼c mark for domestic material. The natural result of this weakness was a drop of ⅜c per lb. for sodium antimoniate, to a basis of 12c, and a loss of ½c for the oxide, the end-of-the-month price being 11½c.

Ammonium bifluoride declined ½c late in June to 14½-16½c. The reason advanced was the lack of interest by the ceramic field. Potassium perchlorate was reduced very early in June to 9c in large quantities, a reduction of ½c. A 1c decline was reported in potassium metabisulfite, the new price being 12c.

Glycerine prices dropped sharply in the middle of the month. This reaction was not wholly unexpected for stocks have been accumulating and the demand has been well below normal. Another factor was the offering of low priced material from abroad and also from Japan. Later in the month soaplye and saponification grades staged a ¾c price recovery, but even with this net losses were recorded for the 30-day period. A more optimistic price feeling, however, prevailed at the end of the month, based largely on the fact that expanding business conditions would bring about an increase in consumption.

Seasonal Items in Demand

Warmer weather has expanded the demand for such items as ammonia, chlorine, calcium chloride, alum, etc. The latter is still in a highly competitive state, but no further price reductions were announced. Competition in acetic is also reported, but no changes were made in the existing price schedule. Demand for such plating items as chromic acid, cyanides, etc., is extremely light, due, of course, to the seasonal let-down in the automotive areas, and which has been accentuated by the fact that this is one of the really poor years in the automotive industry.

Alkalies, Bichromates Firm

Alkalies continue to move out in moderate quantities and the same thing is true of bichromates, the relative demand for the latter by the tanners being somewhat better than from the dry color makers. Copperas is moving out in satisfactory quantities, and with the restricted production of steel the quantity available is none too large. Copper sulfate tonnage is especially heavy and stocks in the hands of producers are still very low.

A better outlook is appearing in several of the process industries which should mean a gradual upturn in chemical deliveries. While the cotton mills are still curtailing operations, the large orders placed in the past 3 weeks will require mills to increase their activity in the very near future. Cotton consumption in May totaled 425,684 bales, as against 414,392 in April and 669,665 in May of last year. Cotton spindles active during May numbered 21,341,750, compared with 21,786,054 in April and 24,656,284 in May of last year. Silk and wool were in the doldrums in June, but a pick-up is expected immediately to take care of fall requirements. Rayon activity is also expanding.

Important Price Changes

	June 30	May 31
ADVANCED		
Acid boric, tech., gran., bgs.	$96.00	$95.00
Borax, tech., bgs.	49.00	48.00
Copper	9.50	9.00
Copper oxide, black	.14¼	.13½
Copper oxide, red	.15¾	.15
Copper sulfate	4.15	4.00
Sodium stannate	.29	.25½
Tin crystals	.34½	.31
Tin metal	42.90	.36⅛
Tin oxide	.46	.44
Tin tetrachloride	.21¾	.18¾
DECLINED		
Ammonium bifluoride	$0.14½	$0.15
Antimony oxide	.11½	.12
Copper chloride	.12½	.13
Glycerine dynamite	.12¾	.15½
Saponification	.09½	.10½
Soaplye	.08½	.09½
Potassium metabisulfite	.12	.13
Potassium perchlorate	.09	.09½
Sodium antimoniate	.12	.12⅜

The paper industry enjoyed a moderate expansion in May, and from reports from widely scattered sections it appears that the increase in activity held during June. Tanners are busier.

Cyanamid's New Plants

American Cyanamid & Chemical has purchased a site on the terminal railway of the Alabama State Docks Commission in Mobile, Ala., for the construction of a chemical plant. Construction of the first unit will start immediately and the chief product will be sulfate of alumina. The company has also procured a tract of land at Savannah, Ga., on which to build a plant for the manufacture of miscellaneous heavy chemicals, including sulfate of alumina.

Victor Starts Production

Actual production was started early in June at the million-dollar Victor Chemical Co. elemental phosphorus plant at Mt. Pleasant, Tenn.

The ultra-modern plant has one big electric furnace, just completed and supplied by TVA power through a special line from the huge TVA substation north of Columbia.

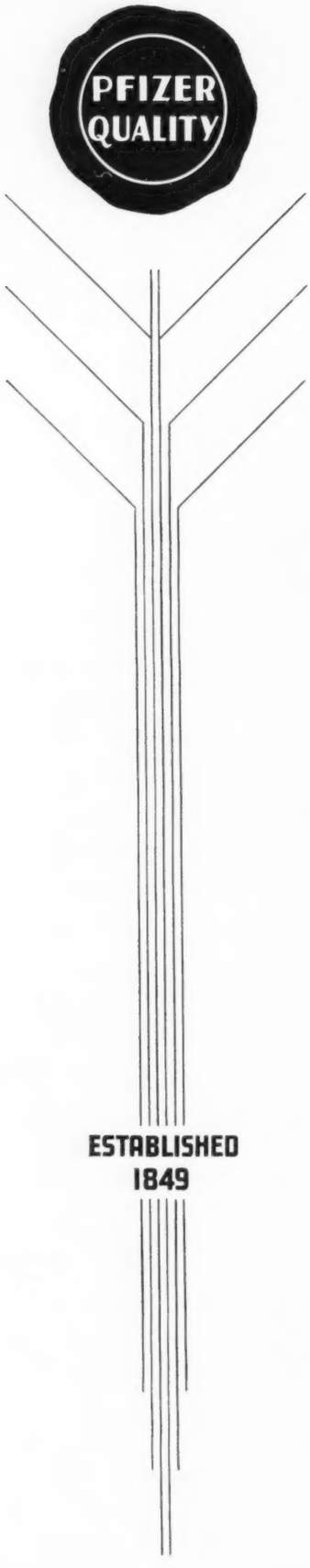
It is situated about a mile from Mt. Pleasant, on the spot where pioneer discoveries of phosphate rock were made more than 40 years ago.

The huge plant, with many buildings and a complete water system, was rushed to completion in record time.

Penn. Salt Exercises Option

Pennsylvania Salt Manufacturing has taken up its option on property at Cascade Locks, Ore., where a plant will be erected for the manufacture of sodium chlorate. Chipman Chemical, Bound Brook, N. J., will market the product. The site is near the Bonneville dam.

• UNIFORMITY — THE ESSENCE OF QUALITY •



BISMUTH SUBCARBONATE

BISMUTH SUBNITRATE

BISMUTH SUBGALLATE

CHAS. PFIZER & CO., INC.

81 MAIDEN LANE, NEW YORK

444 W. GRAND AVE., CHICAGO, ILL.

Tartaric Acid Advanced to 27¼¢

Cream of Tartar Also Priced Higher, But No Changes Were Made In Seidlitz Mixture or Rochelle Salt—U. S. P. Boric and Borax Up $1 a Ton—Pure Alcohol Quotations Raised —C. P. Glycerine Down—Camphor Weak—Acetophenetidin Quoted at $1 Per Lb.—

Greater activity was noted last month in the markets for fine chemicals, pharmaceuticals, aromatic chemicals, and essential oils. The impetus came largely because of a number of rather important price revisions, about equally divided between rises and declines, rather than from any basic improvement in demand. However, stocks in the hands of consumers have, in most instances, declined to the point where replacement purchases are now necessary. Buying is still spotty and largely of the hand-to-mouth variety, but there is ample proof that there is more interest than at any time since the first of the year.

The advances of $1 a ton in carlot quantities for the technical grades of boric acid and borax and $3 for l.c.l. quantities were duplicated in the U.S.P. grades. In each instance the U.S.P. material is quoted $25 a ton above the technical price. The slight rise simply takes care of the increased freight costs and allows a very small increase in the price margin for the distributors.

Tartars Strong

Another 1c advance was made in tartaric acid and a similar increase was announced for cream of tartar. In large quantities the former is now quoted at 27¼c and the latter at 23¼c. The strength in the tartars has been commented upon in these columns now for several months. Although no price revisions were made in the quotations for Seidlitz mixture and Rochelle salt, the trade would not be unduly surprised if advances were made in the near future.

Quite unexpected was the 30c drop in acetophenetidin. This item has maintained price stability at $1.30 for a long period and no change was looked for. It is thought that accumulated stocks in the hands of certain factors was the cause.

Prices on pure alcohol were increased on July 1; the 190 proof material (ex molasses) in tanks is now $4.51½, a rise of 47½c. Two-hundred proof is up 50c, making the carlot drum price $4.90. Industrial alcohol is being quoted over the balance of this year at second quarter prices.

The weakness in glycerine is commented on in the review of the industrial chemicals. The c.p. material in carlots, drums, is now offered at 14¼c, a drop of 1¼c. The current situation is caused by the accumulation of stocks and the lack of sizable buying.

Camphor was weak last month. Buying has been very spotty now for several months, both by industrial users and by the pharmaceutical trade, with the result that stocks have been increasing in the hands of dealers. The synthetic material was reduced 3c, to a basis of 47c, while natural was off 1c, to a basis of 52½c for powder and 57c for tablets. A slightly firmer tone was in evidence in menthol, and as the month closed dealers were holding to a $3.00 level in most instances.

Increased manufacturing facilities and a desire to widen the use for both sorbitol and mannitol caused a 1c decline in the former and a 10c per lb. drop in the latter. Other price changes included a 10c reduction in potassium glycerophosphate, to a basis of 90c per lb.; a loss of 2½c each in potassium hydroxide sticks and sodium hydroxide sticks. The market for aromatic chemicals was without any important price revisions. Demand was light.

Mercury was just a trifle weak last month after the sharp advance made in May, and material was being offered at $80 to $82 a flask. Mercurials were firm and unchanged in price.

Merck Receives Degree

At the 116th annual commencement of the Philadelphia College of Pharmacy and Science, the degree of Doctor of Pharmacy, *honoris causa,* was awarded to George W. Merck. Mr. Merck, who is president of Merck & Co., received the degree in recognition of his contribution in the manufacture of improved medicinal agents for the preservation of public health.

New Vanillin Distributors

Fritzsche Brothers and General Drug, both with headquarters in N. Y. City and branches in important cities, have been appointed distributors of vanillin manufactured by the Salvo Chemical Corp., Rothschild, Wisc. Company produces vanillin in a single step process from lignin.

Brewer (Ciba) Elected

Fourth annual meeting of the Pharmaceutical Advertising Directors Club, on June 28th, elected the following officers: pres.—A. Douglass Brewer (Ciba); vice-pres.—Edward B. Austin (Thomas Leeming); treas.—E. Walton Bobst (Hoffmann-LaRoche); secy.—Edward A. H. King (Crookes).

Douglas Wakefield Coutlee (Merck), who has headed the Club the past two years, presided and announced membership of the Club had increased from thirty-four to forty-six, with most of the leading pharmaceutical houses represented.

Fine Chemicals

Important Price Changes

	June 30	May 31
ADVANCED		
Acid boric, U.S.P. gran., bbls.	$131.00	$130.00
Acid tartaric	.27¼	.26¼
Alcohol, ethyl, 190 proof, bbls.	4.58½	4.11
Alcohol, absolute, drs.	4.90	4.40
Aloin	2.40	2.25
Cream of tartar	.23¼	.22¼
Menthol	3.00	2.95
DECLINED		
Acetophenetidin	$1.00	$1.30
Camphor, synthetic	.47	.50
Nat. powd.	.52½	.53½
Nat. tablets	.57	.58
Glycerin, C.P.	.14¼	.15¼
Mannitol	1.30	1.40
Potassium glycerophosphate	.90	1.00
Potassium hydroxide, sticks	.30½	.33
Sodium hydroxide, sticks	.20½	.23
Sorbitol	.17	.18

Canadian Distributor for Felton

Felton Chemical Company, Brooklyn, will be represented in Canada by the Lewis-Adcroft Co., Montreal. The Lewis-Adcroft organization will carry complete stocks of Felton aromatics, raw materials and flavoring extracts.

Answers FTC Charges

Merck & Co., Rahway, N. J., has filed with the Federal Trade Commission an answer to FTC complaint charging price discrimination in sales to wholesalers. Company defends its price policy and denies that it has been a party to price discriminations between different purchasers of its products buying like grades and quantities.

It explains that it markets its products through wholesalers and through distributors, that they represent different classes of purchasers, and that reagent and C.P. chemicals are quoted to distributors at prices about 13% lower than those quoted to wholesalers generally. Answer further explains that distributors render a service not performed by wholesalers, in that they act as salesmen in calling on laboratories and urging them to use Merck products.

The Consolidated Products Co., Inc., of 15 Park Row, N. Y. City, liquidation specialists, announce that the 125-acre plant of the Detroit Reduction Co. is now for sale piecemeal.

Celluloid Corp., Newark, N. J., has removed its New England headquarters from Worcester to the Foster Bldg., Leominster, Mass.

H. Seymour Colton, Cleveland consulting chemical engineer, moves to the Standard Bldg., where he will have larger quarters.

Coal-tar Chemicals

Coal-tar Chemicals In Moderate Demand

Toluol, Xylol, Solvent Naphtha Shipments to Coatings Manufacturers Are Disappointing—Plastic Industry Fails To Expand Operations—Domestic Cresylic Reduced—Cresol Off 1½c—Benzol Stocks Low—Coking Operations Continue to Decline—Expect Improved Dye Demand Shortly—

Important Price Changes

ADVANCED

	June 30	May 31
None.		

DECLINED

Acid cresylic, dom.,		
H. B.	$0.73	$0.79
L. B.	.78	.87
Cresol, U.S.P.	.10½	.12
Resin grade	.09¼	.10¼
Tar acid oil, 15%, drs.	.22	.22½
25%	.25½	.26½

Industrial Conference

The 21st Annual Silver Bay Industrial Conference will be held Aug. 31-Sept. 3, at Silver Bay on Lake George, N. Y. C. R. Dooley, manager of industrial relations, Socony-Vacuum Oil, heads the committee of 35 which has arranged the conference in cooperation with the Industrial Service of the National Council of the Young Men's Christian Association. No gathering perhaps comes so close as Silver Bay to being a real cross-section of industry—employers, employees, supervisors, labor representatives, and the public. Program as planned by the committee will deal with the more pressing as well as the fundamental matters affecting industrial relations. Details may be had from E. H. T. Foster, executive secretary, 347 Madison ave., N. Y. City.

Study Stream Pollution

In the iron and steel industry an outstanding problem is to prevent stream pollution by waste liquors from such operations as pickling, in which metal is commonly acid-treated. This industry, after endeavoring to solve this problem for many years at heavy expense, has recently founded, through the American Iron and Steel Institute, a fellowship at Mellon Institute of Industrial Research, in Pittsburgh, with the aim of acquiring novel ideas and attempting a definite solution just as soon as possible.

Chemical Symbols

The evolution of chemical symbols is the theme of the leading article in the July issue of *Priorities*, house organ of Prior Chemical Corp., N. Y. City. The story is profusely illustrated with the fanciful designs used in early times, some of which are reminiscent of the Tinker Toy playthings of childhood days. The development from such wholly arbitrary characters, to the modern chemical "shorthand," is sufficiently recent to give the student of today something of a start to find by what a close margin he escaped having to memorize and use the host of intricate hieroglyphics that would be required for present day chemical compounds.

The markets in coal-tar chemicals and solvents were not markedly influenced by the sensational price recovery which took place last month in stocks and wholesale commodities. Shipments were of a very routine nature and inquiries for spot lots were relatively small. With the automotive field more than ever in the doldrums, the solvent requirements of the coatings manufacturers declined last month rather than expanded. Nor was there any marked revival of manufacturing operations in the plastic industry. The railroads and the public utilities are doing little in the way of buying creosote oil. A moderate expansion in the coal-tar disinfectant field was, of course, expected.

Domestic manufacturers of cresylic took cognizance of the price reductions in imported material and instituted a 6c decline in high-boiling acid and a 9c drop in low-boiling material, the new quotations being 73c and 78c, respectively. U.S.P. cresol was off 1½c, to a basis of 10½c, and resin grade is now being quoted at 9¼c, a decline of 1c. The other important price readjustment of the past month was in the grades of tar acid oil. The 15% material was reduced ½c and is now quoted at 22c, while a full cent decline in the 25% grade brought the quotation to 25½c.

Benzol continues to move out in satisfactory quantities and, because of the restricted coking operations, stocks are none too plentiful. In a few instances sellers are experiencing some delay in filling orders promptly in certain sections of the country. Phenol is quiet and withdrawals by the plastic field are quite disappointing so far this year. The refined naphthalene season, of course, has passed its peak. The price structure held up well and the tonnage was generally pleasing to the producers. Momentarily, the demand for crude is off. Imported material is soft.

Only routine interest was displayed in intermediates and coaltar acids. Dye sales reflect the continued restricted operations in the textile, paper, leather, and rubber fields. However, producers are looking for expansion in the call from these industries within the very near future, and an improvement in the shipments of intermediates and other basic materials is expected in the next 30 days.

The outlook for toluol, xylol, and solvent naphtha is not quite as promising. The automotive industry is not expected to show much improvement over the summer period, and in many quarters in the Detroit area the opinion is expressed that little betterment can be hoped for until the introduction of the '39 models. Rising stock markets and sustained improvement in the sentiment of the country over the next 30 or 60 days might alter this condition. Competition from the petroleum solvents, of course, continues, but in the past month the price structure of the coal-tar solvents remained unchanged.

Due to the low state of steel activity and the corresponding decline in coking operations, stocks of coal-tar chemicals are not large. Any appreciable betterment might find producers somewhat short of certain items.

Coke Production Down Again

The downward movement of coke production continued in May. Production of byproduct coke amounted to 2,282,621 tons, a decrease of 9% in comparison with the daily rate obtained in April. Reflecting the continued recession in iron and steel activities, the daily average output at furnace plants dropped 11% from that of April, while at merchant plants the loss amounted to 7%.

Benzol production in May totaled 4,905,000 gals., a decrease of 8.9% from the April figure. Production in May of last year amounted to 10,448,000 gals. In the first 5 months the output of benzol has reached only 28,018,000 gals., as compared with 51,404,000 in the corresponding period of '37.

Swann's New Products

Swann & Co., producer of fine chemicals at Birmingham, Ala., reports that it will shortly begin production of a synthetic paracresol. The 92-94% is expected to find a market in the synthetic resin field, while the production of 98% material will be marketed for use as an intermediate and for special applications.

New Creosoting Plant

A plant which will treat crossties, piling and other heavy wood materials and will employ 50 or 60 persons, will be built in Mobile, Ala., by the Gulfport Creosoting Co.

Strikers Plead Guilty

Thirty-one men pleaded guilty on June 17 to charges that they had violated an injunction prohibiting trespass on the sulfuric acid plant of Consolidated Chemical Industries near Baton Rouge and were given suspended sentences by a state court. The strike has now been settled. The men had previously served federal sentences for violation of the injunction.

Solvent Sales Fail to Improve

Immediate Outlook in the Automotive and Rubber Industries is Unfavorable—Petroleum Solvents Steady in Price—Plastics Still Dull—Methanol Prices Firm and Unchanged—Fair Demand in the East for Cleaners' Naphthas and Stoddard Solvent—

A better demand for petroleum solvents was in evidence in the East than in the Midwest in the past 30 days. This is quite understandable because the coatings manufacturers supplying the automotive field are particularly dull. June automotive production is estimated at 170,000 units and July output is not expected to exceed 130,000 units. Late in July several of the large producers are expected to stop production entirely for various periods, so that the immediate outlook for increased solvent consumption in this direction is not particularly bright. The situation in the general paint and lacquer field is better. Building statistics are beginning to show improvement and the renewal of large-scale PWA operations is expected to aid considerably. As far as prices are concerned they were firm and unchanged. Refiners report fairly large tonnages of cleaners' naphthas booked for delivery in the East.

Rubber solvents moved out slowly. The Akron area is still dull and there is little likelihood of any appreciable gains over the next few months. Better volume in Stoddard Solvent and in V.M.&P. naphthas is anticipated in the next few weeks. The price-cutting in tankwagon prices in the Chicago area which was reported in the May issue, appears to have largely ended. Some price cutting also took place in the Philadelphia area early in the month, but it did not last long and did not spread to other eastern areas.

The movement of acetone, butyl alcohol, ethyl acetate, and the principal plasticizers also reflects the restricted operations in the automotive and rubber fields. The plastics industry's requirements are very moderate.

Methanol prices were firm and unchanged. May production of crude totaled only 330,875 gals., as compared with 522,961 gals. in May of last year, while synthetic output in May of this year totaled 1,860,400 gals., as against 2,353,497 gals. in the corresponding month of '37.

Seasonal Rise in Rubber

A slight seasonal rise in both production and shipments of tires in the Akron area is reported. Statistics released by the Rubber Manufacturers Association for the country show that while May shipments were 37.3% under May, '37, they showed a gain of 5.4% over shipments made in April. Production was up 5% over April, but was 46.9% under May, '37. May production totaled 2,841,549 units, as against 5,351,638 in May of last year. May shipments amounted to 3,372,118 units, as against 5,374,654 in the corresponding month of last year. Inventories are down to 9,855,360, as compared with 12,592,215 units at the end of May, '37.

Ethyl Alcohol Output Figures

May ethyl alcohol production totaled 14,226,450 proof gals., as against 16,938,983 gals. in the same month of '37. Output of completely denatured amounted to 899,696 wine gals., as compared with 921,937 in May of last year. Amount removed totaled 823,778 gals., as compared with 919,461 in May of '37. Stocks at the end of the month were reported at 641,284 gals., slightly under the 794,473 gals. in stock on May 30, '37. Production of specially denatured totaled 5,190,640 gals., as against 6,515,668 in the corresponding period of last year; total removed was 5,268,695 gals., as against 6,591,728; stocks at the end of the month totaled 495,937, a drop from the 783,906 gals. on hand on May 30, '37.

Plastics Still Slow

May production of nitrocellulose sheets totaled only 415,981 lbs., as compared with 453,596 in April, and 1,237,034 lbs. in May of last year. Output of cellulose acetate sheets, rods, and tubes amounted to only 257,722 lbs., as compared with 1,170,106 in May of '37, and with 249,185 lbs. in April of this year. Output of both nitrocellulose and cellulose acetate plastics has declined sharply in the first 5 months of this year from the corresponding period of '37, in fact there are but very few industries in which the drop has been quite so severe.

Ethyl Gasoline on Coast

The Ethyl Gasoline Corp. has completed the construction of a new building in Los Angeles. Structure will serve as headquarters for the Pacific Coast division, and will house a permanent motor clinic for the oil and automotive industries. Portable motor clinics are now being operated by the corporation in Philadelphia, Cleveland, Indianapolis, Wichita, Kan.; Kingston, N. Y.; and Erie, Pa. They will function in more than 100 cities during 1938.

McIntyre Promoted

W. H. McIntyre is the new general manager of Eastern Mineral Spirits Co., N. Y. City, succeeding J. A. Lundy, who resigned June 15. Mr. McIntyre, who has been manager of the Philadelphia office for the company, will supervise the sales and distribution of the company's products in the Philadelphia and N. Y. areas. His headquarters will be in N. Y. City.

Hamilton at New Address

A. K. Hamilton, representing Pennsylvania Alcohol and Franco American Chemical Wks., moves to larger offices in the Squibb Bldg., 745 5th ave., N. Y. City. New telephone is Plaza 3-8700.

News of the Rayon Field

That operations of the Painesville, Ohio, plant of Industrial Rayon Corp. would be up to 50% by the middle of November was the prediction of Hiram S. Rivitz, president, who said that within two or three months later the $7,500,000 plant is expected to be operating at 100% capacity. Plant will manufacture bleached cone yarn under a new process said to shorten the operating time from 3 to 6 days to 4½ minutes.

American Viscose Expands

W. A. B. Vivian, manager of the American Viscose Company plant at Nitro, W. Va., recently confirmed a report that the company will, in the near future, construct an addition to the present Nitro plant. New addition, Mr. Vivian said, will approximately double the output of the company's rayon product and in addition, will employ about 200 more men.

Neoprene Plant Running

Completion of a third unit has put the new Neoprene plant of du Pont at Deepwater, N. J., in full operation, the company announced on June 1.

It was said to have unfilled orders of more than 75,000 lbs. Orders on hand, the company said, are expected to be filled within a reasonable time.

Mathieu's New Plant

A. H. Mathieu & Co., with a plant at 7-11 Getty avenue, Paterson, N. J., has extended its operation to the New England territory, with the establishment of a second plant at 140 Tremont ave., Everett, Mass.

A. H. Mathieu, head of the organization, has long been prominent in the sale of acetic acid and kindred chemical products, having, before founding his own company in 1930, been affiliated with Sherwin-Williams, Olean Sales Corp., Olean, N. Y., and United Piece Dye Works, Passaic, N. J.

Solvents and Plasticizers

Important Price Changes

ADVANCED

	June 30	May 31
None.		

DECLINED

None.

Agricultural Chemicals

Nitrogen Prices For '38-'39 Released

Complete Sulfate Schedule Reported—Nitrate Offered For July Only at Unchanged Levels—Organic Ammoniates Advance in Heavier Trading—Superphosphate Reduced 50c a Ton—Bone Prices Stiffen at Chicago—Firmer Menhaden Market Reported—

Important Price Changes

	June 30	May 31
ADVANCED		
Blood dried, N. Y.	$2.75	$2.50
High grade, Chgo.	2.75	2.35
Imported	3.20	2.90
Bone, raw 4½+50, Chgo.	26.00	25.00
Bone meal, 3+50, Chgo.	20.00	16.00
Bone steamed, 1½+60, Chgo.	18.00	15.00
Fish scrap, dried	3.00	2.75
Wet acidulated	2.75	2.50
Nitrogenous mat., imported	2.65	2.35
Tankage, grd.	2.60	2.50
Ungrd.	2.50	2.35
Chicago	2.40	2.25
DECLINED		
Hoofmeal, Chgo.	$2.35	$2.50
Superphosphate, run of pile	7.50	8.00
16% mat.	8.00	8.50

Rowell in Europe

L. W. Rowell, vice-president, Swift & Co., Chicago, Ill., and Mrs. Rowell sailed June 11, for Europe. They expect to visit a number of European countries.

Del-Mar-Va Convention

The 18th annual convention of the Del-Mar-Va Peninsula Association was held June 25 at Ocean City, Md., with approximately 100 in attendance. Speakers included Charles J. Brand and F. S. Lodge of the N.F.A., and H. G. Guy, entomologist of the Grasselli Pest Control Research Division of du Pont.

Rush Plant Repairs

Repairs to that part of the Tampa plant of The U. S. Phosphoric Products Co. which was destroyed by fire early in June are being pushed rapidly, according to plant manager B. W. Bellinger.

Fertilizer Prices Low

Compared with all commodities, and also with all finished products, fertilizer prices have been at a low level in recent years. In the period from 1929 through 1933, the price of fertilizer fluctuated about the same as prices of commodities in general. Since 1933, though, there has been quite a difference in price trends. The indexes, compiled by the Bureau of Labor Statistics show that while all commodities in April of this year were 31.6% higher than at the 1933 low point, fertilizer prices were only 16.2% higher. The general price level is now 17.5% lower than it was in 1929, but fertilizer prices are 28.3% lower.

The Dept. of Agriculture reports show that prices paid by farmers for fertilizer in March, when most of them were buying their year's supply, were just at the pre-war level. In contrast to this the average of prices paid for all commodities was 25% above pre-war. No other important commodity which the farmer buys is selling as relatively low as is fertilizer.

The fertilizer industry last month largely centered its attention on the issuance of nitrogen prices for the next fertilizer season. The first to appear were those for sulfate which are as follows: July, 1938, shipment, $26.50 per ton; August shipment, $26.75; September shipment, $27; October shipment, $27.25; November shipment, $27.50; December shipment, $27.75; and January-June, 1939, shipment, $28 per ton of 2,000 lbs., in bulk, basis f.o.b., cars nearest Atlantic or Gulf port, and/or $1 per ton less than aforementioned prices f.o.b. cars nearest inland producing ovens, which ever is lower to destination. These prices apply in bulk only and for shipment to fertilizer manufacturers' plants for their own use and consumption. Prices are subject to change without notice.

Nitrate Offered for July Only

Following the sulfate announcement came the report that nitrate would be offered for July only at the same basis that has prevailed for the latter part of last season. Calcium nitrate and 16% cal-nitro prices were extended until further notice. The contract for urea-ammonia liquor continues at $1 per unit of ammonia, f.o.b. Belle, W. Va., or Atlantic or Gulf ports. The '38-'39 schedule for domestic urea-nitrogen compound (42%) is based on $54.40 per ton, in bulk, delivered Atlantic or Gulf ports for July shipment. For August the price is $54.90; $55.40 for September; $55.90 for October; $56.40 for November; $56.90 for December; and $57.40 for the January-June period. Up to the close of the month no announcement had been made as to cyanamid prices for next season.

The organic ammoniates turned decidedly firm in the past 30 day period in direct contrast to the prolonged weakness which has characterized the markets for dried blood, nitrogenous material and tankage. Menhaden fish futures are now back at the season's opening level.

Superphosphate Down 50c

Superphosphate producers have lowered prices 50c a ton and are seeking '38-'39 contracts on the basis of $7.50 for run of the pile and $8 for 16%, both in bulk, f.o.b. cars or vessels, Baltimore. This move was somewhat of a surprise to the industry.

The maximum discount allowance on potash salts expired on June 30. The volume so far contracted for is quite a little under the tonnage in the corresponding period of last year. The current allowance is now 5% and prevails on orders placed prior to Oct. 1 for spot delivery or for delivery in approximate equal monthly tonnages through December.

Activity has increased in the Chesapeake menhaden market. Sales of unground were reported late in the month at $3 and 10c per unit-ton, an increase of 25c over previous sales. Acid scrap was also up 25c to a basis of $2.75 and 10c per unit-ton. Menhaden meal was quoted at $46 at Baltimore, while Japanese meal was offered at $42 a ton for shipment. The bone materials were all firmer and higher in the Chicago market. Raw 4½ and 50 bone closed the month at $26-$27; steamed 3 and 50 meal was advanced late in the month to $20-$23 per ton; while 1½ and 60 steamed bone reached $18-$20 per ton.

A reversal of the downward trend in fertilizer tax tag sales took place in May, reflecting in part a late season in several sections of the country. Total sales in the 17 reporting states amounted to 331,568 tons, 7% larger than in May and 8% larger than in May of '36. In only 5 of the 17 states were May sales smaller this year than last. There were rather larger declines in North Carolina and Florida, while Virginia, Tennessee, and Missouri reported smaller decreases. Sales in Alabama were more than twice as large as a year earlier. Aggregate sales in the 5 midwestern states exceeded May of last year by 27%.

Total sales in the South in the first 5 months amounted to 3,977,000 tons, a decline of 12% from the same period of '37. The only increase was reported by Oklahoma, where consumption is relatively small. The largest declines, percentage-wise, were in South Carolina, Georgia, Florida, and Alabama. In Mississippi and Texas tag sales have been close to the '37 levels. In every one of the Southern states sales have been larger this year than in '36.

Production of sulfate of ammonia at by-product plants continues to reflect the restricted operations in the steel industry. May output amounted to only 64,004,000 lbs., as compared with 68,684,000 lbs. in April, a decline of 6.8%. Production for the first 5 months of this year amounted to only 348,277,000 lbs., as against 693,748,000 in the corresponding months of the previous year.

The Southern Cotton Oil Co. will construct a new modern fertilizer plant at Cordele, Ga.

Fats and Oils

Paint Oils Advance; Buying Improves

Chinawood Moves Higher—Sympathetic Rises in Babassu, Oiticica, and Perilla—Linseed Weak—Refined Fish Oils Lose Ground—Tanners' Oils Steady—

There were more advances than declines in the oils and fats in the past 30 days. An increase in purchasing was quite noticeable when the markets began to move upward, buyers being anxious to cover at least part of their forward requirements. However, futures were only taken in modest quantities and when prices reached higher levels the buying support gave way. Many did not feel that the upward surge in prices would continue and that they would be able to jump into the market when reactions occurred.

Chinawood turned firmer when fear was expressed that the Japanese would shortly take Hankow. Floods also appeared likely to interrupt shipments. Meanwhile or largely because of these fears consumers began to ask for deliveries and the combination of all these circumstances forced drum quotations at the end of the month to 12½c and tanks to 11½c. Sympathetic rises occurred in Babassu, Oiticica, and Perilla, but linseed again lost ground. The demand for paint oils in the past 30 days was better than in May, and in fact, was probably the best month to-date this year, although such a situation is decidedly against normal seasonal trend.

Several of the important vegetable oils were marked higher. Crude coconut, crude corn, and crude peanut moved upward, but strangely enough the refined oils failed to make an advance. Soybean failed to move much in either direction. Strength was quite evident in the animal oils and fats. Greases were also higher, influenced by the strength in tallow. Soapers were fairly active in accumulating stocks. The fish oils were again weak. Crude Menhaden at the month-end was off 8c, to the basis of 27c. The various grades of refined Menhaden and refined sardine lost considerable ground despite the generally better tone to the markets. Of more than passing interest was the decline in whale oil, the first change in this commodity in many months.

According to unofficial customs returns, a total of 4,100 short tons of tung oil were cleared for export from Hankow in May, but investigation reveals that some 4,360 tons were actually shipped out over the Hankow-Canton railway during the month, according to cable advices from the American Consulate General at Hankow, and reported in *The Tung Oil Monthly*.

Of the amount declared for export in May, 330 tons were billed for export to European countries, 1,623 tons for the U. S. and the rest to Hong Kong for re-export. The bulk of the latter, of course, will eventually find its way to the American market. Approximately 45% of the oil shipped from Hankow in May was handled by three Chinese Government-controlled companies.

Hankow stocks at the end of May were reported at 10,315 short tons, which compares with 5,300 tons at the end of the preceding month, and was the largest amount reported since June 1937.

Fair Demand for Tanners' Oils

Tanners' oils were in fair demand over the past month and additional increases in volume are looked for shortly. Neatsfoot oils at the month-end were quoted as follows: 20°C.T. at 14½c; 30°C.T., 11c; extra, 7½c; No. 1, 7c. Sulfonated oils were firm and unchanged from May price levels. Sulfonated cod is quoted at 7c; with 25% mineral oil, 6c. Sulfonated neatsfoot is offered at 10½-11½c, depending upon the grade and the quantity involved. Sulfonated castor is currently selling at 10c for 75% and 8c for the 50% material.

Effect of Large Cotton Crop

The large supply of cottonseed oil from last year's record cotton crop continues to be a major influence in the general fats and oils situation, the Bureau of Agricultural Economics reports. Weakness in consumer purchasing power also is one of the reasons for the lower prices of those products this year than last.

Although the consumption of cottonseed oil in 1937-38 probably will exceed that of any previous year, the Bureau states, the carry-over of both seed and oil to the 1938-39 season is expected to be large. It is estimated that in the 9 months from August through April, some 1,380 million lbs. of refined cottonseed oil passed into use, which is over 9 million more than for the entire 1936-37 season.

Summarizing the situation with respect to certain other important fats, the Bureau notes that lard stocks on June 1 were only 124 million lbs., compared with 194 million lbs. a year earlier. It states that "in view of smaller stocks, the improved export demand, and the prospects for a smaller supply of cottonseed oil next year, little further weakness in lard prices is expected this summer and some advance is not unlikely."

Holdt Visits U. S.

Charles P. Holdt, who is in charge of the research laboratories as well as the production of "Oitioil" and "Cicoil" in Brazil for the Brasil Oiticica S. A. of South America, is now visiting the U. S. Mr. Holdt is well known throughout the paint and varnish industry for his technical research and wide experience with drying oils. He is considered one of the foremost authorities on oiticica oil.

Important Price Changes

ADVANCED

	June 30	May 31
Babassu	$0.06⅜	$0.06¼
Chinawood, drs.	.12½	.10¼
Tks.	.11½	.09½
Coconut, crude, tks.	.03⅜	.03¼
Corn, crude, tks.	.07¼	.07
Oleo stearine, bbls.	.06½	.05½
Oiticica, drs.	.10	.09¼
Palm Niger, drs.	.04	.03⅜
Peanut, crude, tks.	.07¼	.06⅞
Perilla, drs.	.10¼	.10
Tks.	.096	.092
Tallow, acidless, tks.	.08¼	.08
Tallow, animal ed., bbls.	.06¾	.06
Extra loose, bbls.	.05⅜	.04¾

DECLINED

Corn, ref'd, bbls.	$0.09⅜	$0.09½
Linseed, boiled, tks.	.084	.088
Menhaden, crude, tks.	.27	.35
Ref'd alkali, drs.	.07½	.083
Tks.	.069	.077
Blown, drs.	.07½	.083
Kettle-bodied, drs.	.084	.092
Light pressed, drs.	.069	.077
Tks.	.063	.070
Rapeseed, denat.	.75	.80
Sardine, ref'd alkali, drs.	.07½	.087
Tks.	.069	.077
Kettle-bodied, drs.	.084	.093
Light-pressed, drs.	.069	.077
Light-pressed, tks.	.063	.07
Whale, ref'd nat. drs.	.08½	.094
Winter bleach, drs.	.089	.098

O'Leary Honored

James L. O'Leary, manager for Spencer Kellogg and Sons' branch in Hankow, China, was the guest of honor at a dinner given him by officers of the company and some 60 employees recently at the Meadowbrook Country Club, Clarence, N. Y. Mr. O'Leary spoke in detail on the subject of Chinawood procurement, methods of shipment, and the current conditions caused by the Sino-Japanese conflict.

Outlook for Soybean

The uncertain future demand for soybeans points to the need for caution when considering any further increase in production of this crop, the Bureau of Agricultural Economics states in a bulletin issued by the U. S. Dept. of Agriculture. Publication presents a broad economic study of the soybean industry in the U. S. The author is Ernest W. Grove.

Copies of Technical Bulletin No. 619, "Soybeans in the U. S.; Recent Trends and Present Economic Status," may be obtained from the Superintendent of Documents, Washington, D. C., at 5c each.

Buys Whitall-Tatum

Purchase of the Whitall Tatum Co., Millville, N. J., by Armstrong Cork, Lancaster, Pa., has been formally concluded, according to H. W. Prentiss, Jr., president of the Armstrong organization. Mr. Prentiss stated that the Whitall Tatum plants in Millville and in Keyport, N. J., would continue under the same management. Sales forces will be combined.

Natural Raw Materials

Price Movement in Raw Materials Mixed

Better Demand for Natural Tanstuffs—Varnish Gums Decline Further—Zinc Dust Now 6¾c—Bone Dry Shellac Advanced 1c—Quiet Trading in Waxes—Carnauba at Higher Levels—Naval Stores Recover—Japan Large Buyer of Rosin and Turpentine—

Important Price Changes

ADVANCED

	June 30	May 31
Shellac, bone dry	$0.18	$0.17
Wax Carnauba, No. 3, chalky	.33½	.32½
N. C. No. 2	.36½	.35½
N. C. No. 3	.33½	.32½
Yellow No. 1	.43½	.38
Yellow No. 2	.39½	.37
Zinc dust	.06¾	.06

DECLINED

Corn sugar, tanners	$3.15	$3.20
Corn syrup, 42°	3.09	3.14
Corn syrup, 43°	3.14	3.19
Dextrin, corn	3.50	3.55
British Gum	3.75	3.80
Gum, dammar Batavia E, seeds	.07⅜	.07¾
Gum, dammar Batavia A	.21¾	.22⅜
Gum, dammar Batavia B	.20¼	.21
Gum, dammar Batavia C	.16⅝	.18⅛
Gum, Elemi	.08¼	.08¾
Gum, Ester	.06¾	.07¼
Myrobalans, R2	17.50	20.50
Myrobalans, J1	27.00	28.50
Myrobalans, J2	20.00	20.50
Starch, corn, Chgo.	2.60	2.65
Powd., Chgo.	2.70	2.75
Sumac, grd., Sicilian	63.00	63.50
Valonia cups	32.00	33.00

Crosby's New Distributors

The Crosby Naval Stores Co., Picayune, Miss., appoints the following territorial representatives:—For Chicago, St. Louis and Milwaukee, Demert & Daugherty, 3001 W. 47th st., Chicago; for San Francisco, Gilbreath Chemical Co., 383 Brannan st., San Francisco; for Seattle, Spokane and Portland, Carl F. Miller & Co., 1217 6th ave., South, Seattle, Washington; for Vancouver, B. C., Shanahan's, Ltd.; for Michigan and Ontario, C. L. Hueston, 1998 Glendale ave., Detroit; for Cleveland, Fred W. Kamin, 4500 Euclid ave., Cleveland; for Louisville, Thomas H. Gillessey, 1278 Bassett ave., Louisville, Ky.; for Cincinnati, the C. M. Durbin Co., 49 Central ave., Cincinnati, and for Dallas, Texas, the Carroll Co., 1323 Wall st., Dallas.

Raw Materials Council

A Strategic Minerals Committee of the Raw Materials National Council is being formed to encourage further development of the strategic and deficiency mineral resources of the U. S., J. Carson Adkerson, president of the Council, announced through the offices of the Raw Materials National Council.

The Raw Materials National Council, with headquarters in Sioux City, Iowa, was formed in 1936 to obtain parity treatment for raw material products of American forests, farms and mines. The Spend-Lend Relief Bill, recently enacted, carried $212,000,000 to help bring parity to farm products.

Strategic minerals listed by the War Department include manganese, tungsten, nickel, chromium, antimony, tin, platinum, mercury, mica and nitrates.

It can hardly be said that the markets for natural raw materials reflected the general rise in stock and commodity prices last month. Of course trading in most natural raw materials is of the over-the-counter variety and hence their price movements are not quite so sensitive to sudden changes in business. Declines were more numerous than advances. However, should the improvement over the last few weeks continue, it is more than likely that prices will firm up quickly.

Corn derivatives were off 5c very early in the month and then held firmly at the established price levels. Some improvement in demand was noted.

Raw tanning materials were much more active than they have been in months, reflecting the renewed interest on the part of the tanners. June shoe production is thought to have equaled the figure for the same month of last year. The outlook over the balance of '38 is good. Shoe producers have been taking heavy orders in the past 30 days and are calling on tanners for larger volume. The principal price changes in the raw tanning materials consisted of a $1 decline in Valonia cups, a 50c a ton drop in ground Italian sumac, a $3 ton decline in R2 Myrobalans, a $1.50 loss in J1, and a 50c reduction in J2. Particularly good demand was noted for quebracho and mangrove bark.

Momentarily, the demand for tanning extracts is well below normal, but producers express the opinion that an expansion in consumer requirements is quite likely within the next few weeks, possibly sooner. Ordinary solid quebracho is quoted at 4c, and the clarified at 4¼c, plus the duty. Liquid is unchanged at 2⅞c in tanks and 3⅜c in barrels.

Hand-to-mouth buying was still reported the rule in dealings in the natural dyestuffs. Steady price tones continued in annatto, cochineal, indigo, logwood and tumeric with demand light.

The market for the natural varnish gums was weaker in the past few weeks. Local prices were adversely affected by the replacement price news from the primary markets and also by the fact that demand in this country is well below normal and has been for 8 or 9 months.

Zinc dust advanced sharply in the last two weeks of June, based, of course, on the rising metal market. Carlots at the month-end were quoted at 6¾c.

Bone Dry Shellac Up 1c

Shellac took a turn, too, but the only price change was a 1c increase for bone dry. The London and Calcutta markets turned upwards with the general rise in commodities. No change in local quotations on T.N. and superfine was made last month. Factors report that a decided improvement took place in the call for material in the past 30 days, indicating that stocks in dealers' and consumers' hands are at a low ebb.

Quiet trading was reported in the waxes over the 30-day period. A general undertone of steadiness was noted in beeswax, little interest was shown in Japan wax, prices of Carnauba worked higher and the demand was fair. An upward movement in Candelilla is expected, based on the fact that current prices are well below the replacement prices which are now set by the Mexican government.

Naval stores markets in the primary centers reacted favorably with the rise in the financial markets. Turpentine at Savannah jumped 1½c in the 30-day period and all grades of gum rosin were higher. There was a large increase in the volume of export trade, Japan, it is said, taking large quantities. Fairly large size tonnages were sold for delivery to South America. Turpentine moved into paint consuming channels in better volume, but soapers and paper makers were only mildly interested in covering future requirements of rosin. A much more optimistic tone was in evidence in naval stores circles in primary centers in the last few weeks. Offerings are light, indicating that the bulk of production is being placed in storage under the government loan plan. Details of the last naval stores year are given in this month's Statistical and Technical Data Section (Blue Section). The net changes in the Savannah market in the 30-day period are given below:

	June 30	May 31	Net Change for Month
B	$3.40	$3.25	$+0.15
D	3.65	3.50	+0.15
E	3.90	3.55	+0.35
F	4.35	3.90	+0.40
G	4.65	4.10	+0.55
H	4.70	4.17½	+0.52½
I	4.70	4.17½	+0.52½
K	4.70	4.20	+0.50
M	4.70	4.20	+0.50
N	5.30	4.75	+0.55
WG	5.80	5.40	+0.40
WW	6.35	6.10	+0.25
X	6.35	6.10	+0.25
Turpentine	23½	22c	+ 1½c

Louisiana Boganite Corp., Bogalusa, La., has plans under way for a new clay refining plant, for the production of clays for special purposes, including use as a sealing agent and for other service.

Pigments and Fillers

Red Lead Advances Sharply

Lead and Zinc Quotations Rise Unexpectedly—White Pigment Makers Reduce 3rd Quarter Prices Previous to Rise in the Metals—Casein Firms Up—Natural Varnish Resins Weak—Ester Gum Declines ½c On Weakness in Glycerine—Better Demand for Raw Paint Materials—Building Figures More Encouraging—

The sensational and wholly unexpected advances in lead and zinc were the principal topics of conversation in the paint raw material markets last month. Statistically, the metals were in poor shape and there was little reason to expect that sharp advances were near at hand. Several price advances brought lead to $4.75 and zinc to $5.15 to New York. Red lead, litharge, and orange mineral prices were revised upward on each advance in lead. On the other hand reductions were made in blue lead, white lead (carbonate) and basic lead sulfate just before the turn occurred in the metals, and at the close of the month these items were selling considerably out of line. Consumers, of course, were looking momentarily for price revisions.

White pigment prices for the third quarter were announced in the middle of June and just previous to the spurt in the metal markets. Because of the decline in lead and zinc in the past months the pigment makers offered reductions in lithopone, titanium dioxide, titanium pigments, zinc sulfide and in the 35% and 50% leaded grades of zinc oxide. With the metal markets rising, consumers are in a happy position, but their joy is hardly shared by the suppliers.

The net gain in red lead during the month was ¾c, that in litharge and orange mineral the same. Lithopone, on the other hand, is down ¼c, titanium dioxide is off 1c, the barium and calcium pigments are lower by ¼c, 35% zinc oxide is off 1/10c, while the 50% material is down ⅕c. The reduction in white lead last month was the second decline to take place this year. Lead sulfate declined ½c, a similar reduction was made in blue lead, and a ¼c reduction was announced for the carbonate. No change was made in third quarter prices for lead-free zinc oxides.

For the first time in months the prices for casein showed an upward turn. The 80-100 mesh material was up 1c, to a basis of 8½c, while the 20-30 mesh jumped 1½c and is now quoted at 8c. Other price changes included 25c declines in phosphotungstic toner and tungstated Victoria Blue.

The varnish resins were again weak with several important price reductions reported. Cables from abroad indicated that replacement prices were such that the local price structure was out of line. Particularly weak were several grades of dammar Batavia. With the upswing in commodity prices quite general throughout the world, it was thought that some stiffening in the primary markets might follow shortly. The upset in the glycerine market forced a decline in ester gum, the new base price being 6¾c, a drop of ½c.

Somewhat greater activity was reported in shipments and in inquiries by the principal suppliers of raw paint materials in June as compared with May. This trend, contrary to normal, is attributed to the relatively large number of price changes announced last month. Buyers are anxiously watching each little development, hoping to call the turn in prices. Paint manufacturers, although disappointed at the volume of business in the past spring, are hopeful that the summer and fall seasons will prove better than they anticipated a month ago. This optimism is largely built on the assumption that the improvement in sentiment will grow; they also feel that the new "pump-priming" will create considerable volume over the next quarter.

Improved Outlook in Building

Construction contracts awarded in May in 37 Eastern states reached the largest dollar total since last July, according to the Dodge figures which totaled $283,156,000, an increase of 28% over the preceding month and 16% higher than last May. Heavy engineering classification accounted for a large part of the increase, but residential construction also showed a decided increase over April and compared more favorably with the corresponding month of last year. Total for residential contracts was $83,153,000 or only 1% behind last May and 11% better than April. May residential construction was the best in dollar volume since last June.

Paint Sales Disappointing

Factory sales of paints, varnishes, lacquers and fillers continued to lag in April, compared with the corresponding month of 1937, according to reports made to the Bureau of the Census by 680 establishments. Sales reported by these establishments aggregated $34,732,000 in April, which compared with $30,729,000 in the preceding month and $46,345,000 in April 1937.

In comparing April of this year with April 1937, trade sales of these products reported by 580 establishments dropped from $25,102,000 to $20,862,000, and industrial sales by the same establishments from $16,759,000 to $10,393,000. Of the industrial sales, paints and varnishes dropped appreciably from $12,180,000 to $7,498,000, and lacquer sales from $4,579,000 to $2,895,000. Reports of unclassified sales by 100 establishments declined from $4,484,000 to $3,477,000, according to the Census report.

Important Price Changes

	June 30	May 31
ADVANCED		
Casein, 20-30	$0.08	$0.07½
80-100	.08½	.07½
Lead metal, N. Y.	4.75	4.00
Red 95%	.07¼	.06½
97%	.07½	.06¾
98%	.07¾	.07
Litharge	.06¼	.05¼
Orange mineral	.10¼	.09½
Zinc metal	5.15	4.40
DECLINED		
Lead, blue	$0.05¼	$0.06¼
White, carbonate	.06	.06¼
Sulfate	.05¼	.05¾
Lithopone, ord., bgs.	.04⅛	.04⅜
High strength, bgs.	.05⅝	.05⅞
Titanated, bgs.	.05⅝	.05⅞
Titanium dioxide, bgs.	.15	.16
Pigments, bgs.	.05⅝	.05⅞
Toners, phosphotungstic	3.90	4.15
Tungstated Victoria Blue	3.25	3.50
Zinc oxide, 35%, bgs.	.0565	.05¾
50%, bgs.	.0550	.05¾
Zinc sulfide, bgs.	.08⅜	.09

Beck, Koller Changes Name

Beck, Koller & Co., well-known producer of synthetic resins with Detroit headquarters and plants in several parts of this country and abroad, has changed its name to Reichhold Chemicals, Inc. The following is taken from the statement issued by the company:

"Changes in name usually imply such things as refinancing, reorganization, changes in management or personnel, alteration of policies, etc., but in this instance the change is in name only.

"H. Reichhold is still president and chairman of the board, the owners and stockholders remain as before, the same group of officers and executives is still in charge.

Opens N. Y. Warehouse

Atlantic Research Associates, Inc., Newtonville, Mass., has leased space in the Terminal Warehouse, 601 W. 27th st., N. Y. City, as distributing point for its "Aratone" products in the New York area, according to Edward F. Maloney, vice-president. Other warehouse distributing points are located in Chicago, Boston and Los Angeles.

Dahlstrom Promoted

Dr. Roy Dahlstrom, formerly in charge of chemical plant control of the Sayreville, N. J., plant of National Lead's Titanium division, has been appointed assistant director of research for the company. In this capacity, Dr. Dahlstrom will assist J. L. Turner, director of research, and will continue to handle plant research and development problems of the Sayreville plant.

A. C. S. at Milwaukee

Dr. Henry B. Merrill, former chairman of the Division of Leather and Gelatin Chemistry of the A. C. S., has been appointed general chairman of the Society's 96th meeting, to be held in Milwaukee, Wis., Sept. 5 to 9.

Seventeen professional divisions and the microchemical section of the Society have scheduled scientific sessions devoted to virtually every branch of chemistry. The Division of Industrial and Engineering Chemistry will sponsor 3 symposia dealing with "Surface Active Agents," "Unit Processes," and "Electrical Insulating Materials." Eight other symposia during the 5 day meeting will include:

Coal hydrogenation, moisture in coal, the transformation of primary tars into secondary tars, and coal oxidation are among the subjects embraced in the program of the Division of Gas and Fuel Chemistry. Petroleum, fertilizers, cellulose, rubber, and paint and varnish will be discussed in additional Divisional sessions.

Dr. Merrill, who is captain in the Chemical Warfare Service Reserve, is chief chemist of A. F. Gallun and Sons Corp., tanners in Milwaukee. He is a former councillor of the American Leather Chemists Association and has published over 30 papers dealing with various phases of leather chemistry. He is also joint author of a study of analytical methods for tannery laboratories.

Landis on Inflation

Vice-president Walter S. Landis, Cyanamid, and recognized as an authority on the subject of inflation was the principal speaker at the second in the series of luncheon meetings of the Drug, Chemical and Allied Trades Section of the N. Y. Board of Trade, held at the Pennsylvania on June 21. Dr. Landis was introduced by Thomas R. Farrell, editor of *Drug & Cosmetic Industry*. The speaker reviewed the history of the various inflations in several of the European countries, notably in Germany.

Philip Dinkins, vice-president, American Cyanamid & Chemical, chairman of the section, announced at the luncheon that the fall meeting of the section will be held Oct. 21-22 at Skytop Lodge, Skytop, Pa.

Haynes Before N. E. Council

Unless New England manufacturers are prepared to meet "the rapid and revolutionary changes characteristic of the chemical age," they will be unable to withstand competition caused by the "great chemical expansion in our Southern states," Williams Haynes, publisher of CHEMICAL INDUSTRIES, warned at the 51st quarterly meeting of the New England Council, held on June 25 at Woodstock, Vt.

Mr. Haynes was one of 3 speakers who urged New England production of plastic and other chemical synthetic products, and that textile mills expand operations by making filament and staple rayon.

Mr. Haynes suggested a survey by the council of chemical resources of New England and recommended that the study include not only standard chemicals, but also plastics, synthetic resins, coatings, emulsifiers and other industrial and agricultural chemical specialties.

Dr. Gustavus J. Esselen, Boston, consultant, spoke on New England's favorable position with respect to growing of cellulose on a "perpetually reproductive basis."

Honored in June

Roger Williams, chemical director, Ammonia Dept., du Pont, received the honorary degree of Doctor of Science at the commencement exercises of the West Virginia University, Morgantown, W. Va., June 7. Degree was conferred by President Chauncey S. Boucher in recognition of Dr. Williams' distinguished services in chemical research, particularly in the field of high pressure synthesis leading to the commercial processes now so prominent in West Virginia's industrial community.

The honorary degree of Doctor of Science was conferred on Harry B. Meller by the University of Toledo on June 13, at the University's 55th annual commencement. Dr. Meller is managing director of Air Hygiene Foundation, an organization for the advancement of industrial health. He is a Senior Fellow at Mellon and has been in charge of air hygiene researches at that institution for 20 years.

Walter Barnes Howe, general sales manager of N. V. Potash, was made a Chevalier of the French Legion of Honor on June 3, in ceremonies held at the French Consulate in N. Y. City. Count M. C. de Ferry de Fontnouvelle, Consul-General of France in New York, presented the medal and the citation to Mr. Howe in recognition of distinguished services.

"The Gangplank"

Howard W. Elkinton, Philadelphia Quartz, has consented to become secretary of the Berlin office of The American Friends Service Committee. Accompanied by his family Mr. Elkinton sailed in the *Georgic* on June 25. His new address is Prinz Louis Ferdinands Strasse, Berlin, N.W. 7.

Maurice V. Girard of the engineering staff of Acticarbone Corp., N. Y. City, will arrive July 10 in the *De Grasse*. He has had many years of experience in the design and erection of adsorption equipment for solvent recovery and dehydration of air and gases, and will henceforth be attached to the N. Y. office of the Acticarbone group.

A. A. Teeter, Charles Pfizer & Co., N. Y. City, sailed June 8 in the *Queen Mary* accompanied by his son Albert. They will spend several weeks wandering about the Continent and the British Isles on a candid camera expedition. A number of Mr. Teeter's photographs appear in the rotogravure section of this issue.

F. H. Leonhardt, president, Fritzsche Brothers, aromatic chemicals, N. Y. City, accompanied by Mrs. Leonhardt, returned from Europe June 16. While in Europe, they were joined in Paris by Dr. Guenther, research director for the organization. The three then went to Seinlas, France, plant of the company, which plant was recently enlarged and modernized.

Unemployment Increases

The Chemist Advisory Council, successor to the Committee on Unemployment and Relief of Chemists and Chemical Engineers, has undertaken a comprehensive study looking to a solution of the problems of unemployment of members of the chemical profession. Unemployed chemists are being encouraged to register with the council, and, in turn, the council is endeavoring to render assistance in several directions, advice or more tangible relief where the urgency of the case demands the latter course.

During May and June 164 chemists and chemical engineers registered as compared with 196 during the previous 4 months, showing a considerable increase in calls for help. During the last two months only 11 reported that they had secured employment.

The Electrochemical Society and the American Institute of Chemical Engineers have granted permission to Chemist Advisory Council to use their names as sponsoring groups.

One Million in Savings

National Carbide & Carbon distributed $1,000,000 in savings to approximately 2,000 employees in 9 plants on July 4.

Each employee deposited 10% of his earnings in a 3-year savings plan and for every dollar deposited the firm added 50c.

Salesmen's Golf Dates

The next golf party of The Salesmen's Association of the American Chemical Industry takes place at Garden City Country Club, Garden City, L. I., on July 12. The August party will be held at the Green Meadow Golf Club, Harrison, N. Y., on the 16th. Those who held membership cards for '38 and attended the opening tournament at Baltusrol will get a free ride at Green Meadow. The final tournament will be held at Shackamaxon Country Club, Westfield, N. J., on Sept. 13th. As usual, special entertainment will be provided at the last outing.

ALUMINUM ACETATE

for the preparation of better

WATER-REPELLENT TREATMENTS FOR TEXTILE FABRICS

NORMAL

ALUMINUM ACETATE

20% SOLUTION

SOLUBLE

BASIC ALUMINUM ACETATE

32% SOLUTION

ADVANTAGES

1. Freedom from undesirable sulphates and chlorides
2. Uniformity and stability guaranteed
3. Easily compounded with wax emulsions
4. Prompt shipment from factory stock
5. Treatment minimizes dyestuff bleeding by mordant action
6. Treatment imparts better wearing properties

NIACET

CHEMICALS CORPORATION

Sales Office and Plant ⁘ Niagara Falls, N. Y.

ABC

CRESYLIC ACID

CASEIN

Dibutyl Phthalate
Diethyl Phthalate
Dimethyl Phthalate
Triacetin

AMERICAN-BRITISH CHEMICAL SUPPLIES, Inc.
180 MADISON AVE., NEW YORK, N.Y.

Prices Current

Heavy Chemicals, Coal-tar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Petroleum Solvents and Chemicals, Naval Stores, Fats and Oils, etc.

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Import chemicals are so designated. Resale stocks when a market factor are quoted in addition to maker's prices and indicated "second hands."

Oils are quoted spot New York, ex-dock. Quotations f. o. b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f. o. b., or ex-dock. Materials sold f. o. b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1937 Average $1.10 - Jan. 1938 $1.20 - June 1938 $1.24

		Current Market		1938		1937	
			Low	High	Low	High
Acetaldehyde, drs, c-l, wks	lb.	...	.14	...	.14	...	.14
Acetaldol, 95%, 50 gal drs wks	lb.	.21	.25	.21	.25	.21	.25
Acetamide, tech, lcl, kegs	lb.	.39	.43	.32	.43	.32	.43
Acetanalid, tech, 150 lb bbls	lb.	...	.32	.29	.32	.24	.29
Acetic Anhydride, drs, f.o.b. wks, frt all'd	lb.	.10½	.11	.10½	.11	.13	.15
Acetin, tech, drs	lb.	...	.33	...	.33	.22	.33
Acetone, tks, f.o.b. wks, frt all'd	lb.	...	.04¾	...	.04¾	.04¾	.06½
drs, c-l, f.o.b. wks, frt all'd	lb.	...	.05¾	...	.05¾	.05¾	.07½
Acetyl chloride, 100 lb cbys	lb.	.55	.68	.55	.68	.55	.68
ACIDS							
Abietic, kgs, bbls	lb.	.09¾	.10	.09¾	.10	.06¾	.10
Acetic, 28%, 400 lb bbls, c-l, wks	100 lbs.	...	2.23	...	2.23	2.23	2.53
glacial, bbls, c-l, wks	100 lbs.	...	7.62	...	7.62	7.62	8.70
glacial, USP, bbls, c-l, wks	100 lbs.	...	10.25	...	10.25	10.50	12.43
Acetylsalicylic, USP, 225 lb bbls	lb.	...	.60	...	.60	.50	.60
Adipic, kgs, bbls	lb.	...	.72	...	.72	...	.72
Anthranilic, ref'd, bbls	lb.	1.15	1.20	1.15	1.20	.85	1.00
tech, bbls	lb.	...	.75	...	.75	...	.75
Battery, cbys, wks	100 lbs.	1.60	2.55	1.60	2.55	1.35	2.60
Benzoic, tech, 100 lb kgs	lb.	.43	.47	.43	.47	.43	.47
USP, 100 lb kgs	lb.	.54	.59	.54	.59	.54	.59
Boric, tech, gran, 80 tons, bgs, delv	ton *a*	...	96.00	95.00	96.00	...	95.00
Broenner's, bbls	lb.	...	1.11	...	1.11	...	1.11
Butyric, edible, c-l, wks, cbys	lb.	1.20	1.30	1.20	1.30	1.20	1.30
synthetic, c-l, drs, wks	lb.	...	.22	...	.22	...	.22
wks, lcl	lb.	...	.23	...	.23	...	.23
tks, wks	lb.	...	.21	...	.21	...	.21
Camphoric, drs	lb.	5.50	5.70	5.50	5.70	5.50	5.70
Chicago, bbls	lb.	...	2.10	...	2.10	...	2.10
Chlorosulfonic, 1500 lb drs, wks	lb.	.03½	.05	.03½	.05	.03½	.05
Chromic, 99¾%, drs, delv	lb.	.15¼	.17¼	.15¼	.17¼	.15¼	.16¾
Citric, USP, crys, 230 lb bbls	lb. *b*	.23	.24	.23	.25	.24	.26
anhyd, gran, bbls	lb. *b*	...	.25½	.25½	.26½	.26½	.29
Cleve's, 250 lb bbls	lb.	.50	.52	.50	.52	.50	.52
Cresylic, 99%, straw, HB, drs, wks, frt equal	gal.	.73	.74	.73	.91	.72	.91
99%, straw, LB, drs, wks, frt equal	gal.	.78	.86	.78	.94	.77	.94
resin grade, drs, wks, frt equal	lb.	.09¼	.09¾	.09¼	.11¼	.09	.11¼
Crotonic, bbls, delv	lb.	.21	.50	.21	1.00	.75	1.00
Formic, tech, 140 lb drs	lb.	.10½	.11½	.10½	.11½	.10½	.13
Fumaric, bbls	lb.	...	.60	...	.60	...	.60
Fuming, see Sulfuric (Oleum)							
Gallic, tech, bbls	lb.	.75	.79	.75	.79	.65	.75
USP, bbls	lb.	.87	.91	.87	.91	.77	.91
Gamma, 225 lb bbls, wks	lb.	...	.85	...	.85	...	.85
H, 225 lb bbls, wks	lb.	.50	.55	.50	.55	.50	.55
Hydriodic, USP, 10% sol. cbys	lb.	.50	.51	.50	.51	.50	.51
Hydrobromic, 34% conct 155 lb cbys, wks	lb.	.42	.44	.42	.44	.40	.42
Hydrochloric, see muriatic							
Hydrocyanic, cyl, wks	lb.	.80	1.30	.80	1.30	.80	1.30
Hydrofluoric, 30%, 400 lb bbls, wks	lb.	.07	.07½	.07	.07½	.07	.07½
Hydrofluosilicic, 35%, 400 bbls, wks	lb.	.10½	.15	.10½	.15	.10½	.15
Lactic, 22%, dark, 500 lb bbls	lb.	.02½	.02¾	.02½	.02¾	.02½	.02¾
22%, light ref'd, bbls	lb.	.03½	.03¾	.03½	.03¾	.03½	.03¾
44%, light, 500 lb bbls	lb.	.05½	.05¾	.05½	.05¾	.05½	.05¾
44%, dark, 500 lb bbls	lb.	.06½	.06¾	.06½	.06¾	.06½	.06¾
50%, water white, 500 lb bbls	lb.	.10½	.11½	.10½	.11½	.10½	.11½
USP X, 85%, cbys	lb.	.42	.45	.42	.45	.42	.50
Lauric, drs	lb.	.08½	.09	.08½	.09	...	...
Laurent's, 250 lb bbls	lb.	.45	.46	.45	.46	.45	.46
Levulinic, 5 lb bot, wks	lb.	...	2.00	...	2.00	...	...
Linoleic, bbls	lb.	...	.20	...	.20	.16	.20
Maleic, powd, kgs	lb.	.30	.40	.30	.40	.29	.40
Malic, powd, kgs	lb.	.45	.60	.45	.60	.45	.60
Metanillic, 250 lb bbls	lb.	.60	.65	.60	.65	.60	.65
Mixed, tks, wks	N unit	.06½	.07¼	.06½	.07¼	.06½	.07¼
	S unit	.008	.009	.008	.009	.008	.009
Monochloracetic, tech, bbls	lb.	.16	.18	.16	.18	.16	.18
Monosulfonic, bbls	lb.	1.50	1.60	1.50	1.60	1.50	1.60
Muriatic, 18°, 120 lb cbys, c-l, wks	100 lb.	...	1.50	...	1.50	1.35	1.50
tks, wks	100 lb.	...	1.00	...	1.00	...	1.00
20°, cbys, c-l, wks	100 lb.	...	1.75	...	1.75	1.45	1.75
tks, wks	100 lb.	...	1.10	...	1.10	...	1.10
22°, c-l, cbys, wks	100 lb.	...	2.25	...	2.25	1.95	2.25
tks, wks	100 lb	...	1.60	...	1.60	...	1.60
CP, cbys	lb.	.06½	.07⅛	.06½	.07⅛	.06½	.07⅛
N & W, 250 lb bbls	lb.	.85	.87	.85	.87	.85	.87
Naphthenic, 240-280 s.v., drs	lb.	.10	.13	.10	.13	.10	.14
Sludges, drs	lb.	...	.05	...	.05	.05	.10
Naphthionic, tech, 250 lb bbls	lb.	.60	.65	.60	.65	.60	.65
Nitric, 36°, 135 lb cbys, c-l, wks	100 lb. *c*	...	5.00	...	5.00	...	5.00
38°, c-l, cbys, wks	100 lb. *c*	...	5.50	...	5.50	...	5.50
40°, cbys, c-l, wks	100 lb. *c*	...	6.00	...	6.00	...	6.00
42°, c-l, cbys, wks	100 lb. *c*	...	6.50	...	6.50	...	6.50
CP, cbys, delv	lb.	.11½	.12½	.11½	.12½	.11½	.12½
Oxalic, 300 lb bbls, wks, or N Y	lb.	.10¾	.12	.10¾	.12	.10¾	.12
Phosphoric, 85%, USP, cbys	lb.	.12	.14	.12	.14	.12	.14
50%, acid, c-l, drs, wks	lb.	.06	.08	.06	.08	.06	.08
75%, acid, c-l, drs, wks	lb.	.09	.10½	.09	.10½	.09	.10½
Picramic, 300 lb bbls, wks	lb.	.65	.70	.65	.70	.65	.70
Picric, kgs, wks	lb.	.35	.40	.35	.40	.35	.40
Propionic, 98% wks, drs	lb.	...	.22	...	.22	.20	.22
80%	lb.	.16	.17½	.16	.17½	.16	.17½
Pyrogallic, tech, lump, pwd, bbls	lb.	...	1.05	...	1.05	...	...
cryst, USP	lb.	1.45	1.63	1.45	1.63	1.30	1.48
Ricinoleic, bbls	lb.	...	.35	.35	.38	.35	.38
tech, bbls	lb.	...	.13	...	.13	...	...
Salicylic, tech, 125 lb bbls, wks	lb.	...	.33	...	.33	...	.33
USP, bbls	lb.	.40	.45	.40	.45	...	...
Sebacic, tech, drs, wks	lb.	.37	.41	.37	.41	.37	.41
Succinic, bbls	lb.	...	.75	...	.75	...	.75
Sulfanilic, 250 lb bbls, wks	lb.	.17	.18	.17	.18	.17	.18
Sulfuric, 60°, tks, wks	ton	...	13.00	...	13.00	12.00	13.00
c-l, cbys, wks	100 lb.	...	1.25	...	1.25	1.10	1.25
66°, tks, wks	ton	...	16.50	...	16.50	15.50	16.50
c-l, cbys, wks	100 lb.	...	1.50	...	1.50	1.35	1.50
CP, cbys, wks	lb.	.06½	.07½	.06½	.07½	.06½	.07½
Fuming (Oleum) 20% tks, wks	ton	...	18.50	...	18.50	...	18.50
Tannic, tech, 300 lb bbls	lb.	.40	.47	.40	.47	.19	.47
Tartaric, USP, gran, powd, 300 lb bbls	lb.	.27¼	.27¾	.24¼	.27¾	.21¾	.25¼
Tobias, 250 lb bbls	lb.	.65	.67	.65	.67	.65	.67
Trichloroacetic bottles	lb.	2.00	2.50	2.00	2.50	2.00	2.50
kgs	lb.	...	1.75	...	1.75	...	1.75
Tungstic, tech, bbls	lb.	no price					
Vanadic, drs, wks	lb.	1.10	1.20	1.10	1.20	1.10	1.20
Albumen, light flake, 225 lb bbls	lb.	.52	.60	.52	.60	.47	.60
dark, bbls	lb.	.13	.18	.11	.18	.11	.17
egg, edible	lb.	.82	.84	.80	1.15	.76	1.15
vegetable, edible	lb.	.74	.78	.74	.78	.76	.78
Alcohol, Amyl (from Pentane) tks, delv	lb.	...	.123	...	.123	...	.123
c-l, drs, delv	lb.	...	.133	...	.133	...	.133
lcl, drs, delv	lb.	...	.143	...	.143	...	.143
Amyl, secondary, tks, delv	lb.	...	.08½	...	.08½	...	.08½
drs, c-l, delv E. of Rockies	lb.	...	.09½	...	.09½	...	...
Benzyl, cans	lb.	.68	1.00	.68	1.00	.65	1.10
Butyl, normal, tks, f.o.b. wks, frt all'd	lb. *d*	...	.09	...	.09	.08½	.09
c-l, drs, f.o.b. wks, frt all'd	lb. *d*	...	.10	...	.10	.09½	.10
Butyl, secondary, tks, delv	lb. *d*	...	.06	...	.06	.06	.07
c-l, drs, delv	lb. *d*	...	.07	...	.07	.07	.08
Capryl, drs, tech, wks	lb.	...	.85	...	.85	...	.85
Cinnamic, bottles	lb.	2.00	2.50	2.00	2.50	2.00	3.65
Denatured, CD, 14, 13, c-l, drs, wks	gal. *e*	...	.35	.33	.35	.33	.35
tks, East, wks	gal.	...	.27	.27	.29	...	...
Western schedule, c-l, drs, wks	gal. *e*	...	.38	.33	.38	.37	.39
Denatured, SD, No. 1, tks		...	.25	.25	.27	.26	.27
c-l, drs, wks	gal. *e*	...	.31	.31	.33	.32	.33

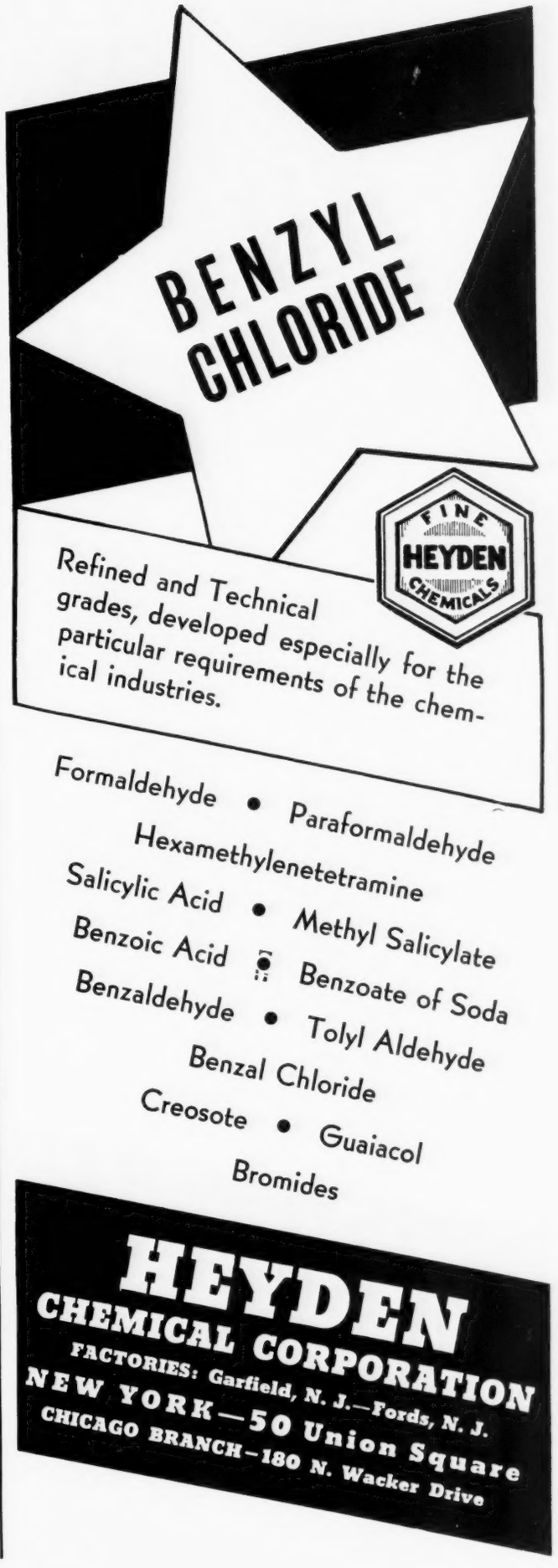
a Powdered boric acid $5 a ton higher in each case; USP $15 higher; *b* Powdered citric is ½c higher; kegs are in each case ½c higher than bbls.; *y* Price given is per gal.

c Yellow grades 25c per 100 lbs. less in each case; *d* Spot prices are 1c higher; *e* Anhydrous is 5c higher in each case; *f* Pure prices are 1c higher in each case.

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

		Current Market	1938 Low	1938 High	1937 Low	1937 High
Alcohols (continued):						
Diacetone, pure, c-l, drs, delv	lb. *f*	...	.11½	...	.11½	... .11½
tech, contract, drs, c-l, delv	lb.	...	.10½	...	.10½	... ...
Ethyl, 190 proof, molasses, tks	gal. *g*	...	4.51½	4.04	4.51½	4.05 4.07
c-l, drs	gal. *g*	...	4.59½	4.10	4.59½	4.11 4.12
c-l, bbls	gal. *g*	...	4.58½	4.11	4.58½	4.12 4.13
absolute, drs	gal. *g*	4.90	4.95	4.40	4.95	4.54 6.08½
Furfuryl, tech, 500 lb drs	lb.	.30	.35	.30	.35	.30 .35
Hexyl, secondary tks, delv	lb.	...	.12	...	.12	.11½ .12
c-l, drs, delv	lb.	...	.13	...	.13	.12½ .13
Normal, drs, wks	lb.	3.25	3.50	3.25	3.50	3.25 3.50
Isoamyl, prim, cans, wks	lb.	...	.32	...	.32	... .32
drs, lcl, delv	lb.	...	.27	...	.27	... .27
Isobutyl, ref'd, lcl, drs	lb.	...	.10	...	.10	... .10
c-l, drs	lb.	...	.09½	...	.09½	... .09½
tks	lb.	...	.08½	...	.08½	... .08½
Isopropyl, ref'd, 91%, c-l, drs, f.o.b. wks, frt all'd	lb.	...	.36	...	.36	.39½ .45
Ref'd 98%, drs. f.o.b. wks, frt all'd	gal.	...	.41	...	.41	... ...
Tech 91%, drs, above terms	gal.	...	.33½	...	.33½	... ...
tks, same terms	gal.	...	.28½	...	.28½	... ...
Tech 98%, drs, above terms	gal.	...	.37½	...	.37½	... ...
tks, above terms	gal.	...	.32½	...	.32½	... ...
Spec Solvent, tks, wks	gal.	...	.26	.26	.28	.27 .28
Aldehyde ammonia, 100 gal drs	lb.	.80	.82	.80	.82	.80 .82
Aldehyde Bisulfite, bbls, delv	lb.	...	.17	...	.17	... ...
Aldol, 95%, 55 and 110 gal drs, delv	lb.	...	.20	...	.20	... ...
Alphanaphthol, crude, 300 lb bbls	lb.	...	.52	...	.52	... .52
Alphanaphthylamine, 350 lb bbls	lb.	.32	.34	.32	.34	.32 .34
Alum, ammonia, lump, c-l, bbls, wks	100 lb.	3.40	3.65	3.40	3.65	3.00 3.25
delv NY, Phila	100 lb.	...	3.40	...	3.40	3.15 3.40
Granular, c-l, bbls. wks	100 lb.	3.15	3.40	3.15	3.40	2.75 3.00
Powd, c-l, bbls, wks	100 lb.	...	3.55	...	3.55	3.15 3.40
Chrome, bbls	100 lb.	6.50	6.75	6.50	6.75	6.50 7.25
Potash, lump, c-l, bbls, wks	100 lb.	3.65	3.90	3.65	3.90	3.25 3.50
Granular, c-l, bbls, wks	100 lb.	3.40	3.65	3.40	3.65	3.00 3.25
Powd, c-l, bbls, wks	100 lb.	3.80	4.05	3.80	4.05	3.40 3.65
Soda, bbls, wks	100 lb.	...	3.25	...	3.25	... 3.25
Aluminum metal, c-l, NY	100 lb.	...	20.00	...	20.00	19.00 20.00
Acetate, 20%, bbls	lb.	.07½	.09	.07½	.10	.09 .10
Basic powd, bbls, delv	lb.	.40	.50	.40	.50	... ...
Chloride anhyd, 99%, wks	lb.	.07	.12	.07	.12	.07 .12
93%, wks	lb.	.05	.08	.05	.08	.05 .08
Crystals, c-l, drs, wks	lb.	.06	.06¼	.06	.06¼	.06 .06¼
Solution, drs, wks	lb.	.02¾	.03¼	.02¾	.03¼	.02¾ .03¼
Formate, 30% sol bbls, c-l, delv	lb.	...	.13	...	.13	... ...
Hydrate, 96%, light, 90 lb bbls, delv	lb.	.12	.13	.12	.13	.13 .15
heavy, bbls, wks	lb.	.029	.03½	.029	.03½	.029 .03½
Oleate, drs	lb.	.16¾	.18½	.16¾	.18½	.16¼ .18½
Palmitate, bbls	lb.	...	.23	...	.23	.22 .23
Resinate, pp., bbls	lb.	...	.15	...	.15	... .15
Stearate, 100 lb bbls	lb.	.19	.21	.19	.21	.19 .21
Sulfate, com, c-l, bgs, wks	100 lb.	...	1.15	1.15	1.35	... 1.35
c-l, bbls, wks	100 lb.	...	1.35	1.35	1.55	... 1.55
Sulfate, iron-free, c-l, bgs, wks	100 lb.	...	2.00	...	2.00	... 1.90
c-l, bbls, wks	100 lb.	...	2.20	...	2.20	... 2.05
Aminoazobenzene, 110 lb kgs	lb.	...	1.15	...	1.15	... 1.15
Ammonia anhyd fert com, tks	lb.	.04½	.05½	.04½	.05½	.04½ .05½
Ammonia anhyd, 100 lb cyl	lb.	.16	.22	.16	.22	.16 .22
26°, 800 lb drs, delv	lb.	.02¼	.02½	.02¼	.02½	.02¼ .02½
Aqua 26°, tks, NH	cont.	...	.05	...	.05	.04½ .05
tk wagon	lb.	...	.02	...	.02	... .02
Ammonium Acetate, kgs	lb.	.26	.33	.26	.33	.26 .33
Bicarbonate, bbls, f.o.b. wks	100 lb.	5.15	5.71	5.15	5.71	5.15 5.71
Bifluoride, 300 lb bbls	lb.	.14½	.16½	.14½	.17	.16 .17
carbonate, tech, 500 lb bbls	lb.	.08	.12	.08	.12	.08 .12
Chloride, White, 100 lb bbls, wks	100 lb.	4.45	4.90	4.45	4.90	4.45 4.90
Gray, 250 lb bbls, wks	100 lb.	5.50	6.25	5.50	6.25	5.00 6.25
Lump, 500 lbs cks spot	lb.	.10½	.11	.10½	.11	.10½ .11
Lactate, 500 lb bbls	lb.	.15	.16	.15	.16	.15 .16
Laurate, bbls	lb.	...	.23	...	.23	... ...
Linoleate, 80% anhyd, bbls	lb.	...	.15	...	.15	.11 .15
Naphthenate, bbls	lb.	...	.17	...	.17	... ...
Nitrate, tech, cks	lb.	.038	.0405	.038	.0405	.03¾ .04
Oleate, drs	lb.	...	.15	...	.15	.15 .10
Oxalate, neut, cryst, powd, bbls	lb.	.19	.20	.19	.22½	.22½ .23
Perchlorate, kgs	lb.	...	.16	...	.16	... .16
Persulfate, 112 lb kgs	lb.	.21	.24	.21	.24	.21 .24
Phosphate, dibasic tech, powd, 325 lb bbls	lb.	.07½	.10	.07½	.10	.07½ .10
Ricinoleate, bbls	lb.	...	.15	...	.15	... ...
Stearate, anhyd, bbls	lb.	...	.24	...	.24	... ...
Paste, bbls	lb.	...	.07½	...	.07½	... ...

g Grain alcohol 20c a gal. higher in each case.





Ammonium Sulfate
Borax

Prices

	Current Market	1938 Low	1938 High	1937 Low	1937 High
Ammonium (continued).					
Sulfate, dom, f.o.b., bulk ton	...	26.50	26.50	28.50	26.00	28.00
200 lb bgs ton	...	27.80	27.80	29.80	...	29.30
100 lb bgs lb.	...	28.50	28.50	30.50	...	30.00
Sulfocyanide, pure, kgs lb.	...	.55	...	.55	...	.55
Amyl Acetate (from pentane)						
tks, delv lb.	...	.11½	...	.11½	...	.11½
tech, drs, delv lb.	...	.12	...	.12	.11½	.13½
Secondary, tks, delv lb.	...	.08½	...	.08½	...	.08½
c-l, drs, delv lb.	...	.09½	...	.09½	...	.09½
tks, delv lb.	...	.08½	...	.08½	...	.08½
Chloride, norm, drs, wks lb.	.56	.68	.56	.68	.56	.68
mixed, drs, wks lb.	.07	.077	.07	.077	.07	.077
tks, wks lb.	...	.06	...	.06	...	.06
Mercaptan, drs, wks lb.	...	1.10	...	1.10	...	1.10
Oleate, lcl, wks, drs lb.	...	.25	...	.25	...	.25
Stearate, lcl, wks, drs lb.	...	.26	...	.26	...	.26
Amylene, drs, wks lb.	.102	.11	.102	.11	.102	.11
tks, wks lb.	...	.09	...	.09	...	.09
Aniline Oil, 960 lb drs and tks lb.	.14½	.17½	.14½	.17½	.15	.17½
Annatto fine lb.	.34	.37	.34	.37	.34	.37
Anthracene, 80% lb.	...	.75	...	.75	...	.75
40% lb.	...	.18	...	.18	...	.18
Anthraquinone, sublimed, 125 lb bbls lb.	...	.65	...	.65	.50	.65
Antimony metal slabs, ton lots lb.	...	.11¼	11¼	.14	.13⅝	.17¼
Butter of, see Chloride.						
Chloride, soln cbys lb.	...	.17	...	.17	...	.17
Needle, powd, bbls lb.	.12½	.14	.12½	.16	.14	.19½
Oxide, 500 lb bbls lb.	.11½	.12½	.11½	.16½	.14¼	.16½
Salt, 63% to 65%, tins lb.	.26	.27	.26	.27	.22	.24
Sulfuret, golden, bbls lb.	.22	.23	.22	.23	.22	.23
Archil, conc, 600 lb bbls lb.	.21	.27	.21	.27	.21	.27
Double, 600 lb bbls lb.	.18	.20	.18	.20	.18	.20
Aroclors, wks lb.	.18	.30	.18	.30	.18	.30
Arrowroot, bbl lb.	.08½	.09	.08½	.09	.08½	.09¾
Arsenic, Metal lb.	.42	.44	.42	.44	.42	.44
Red, 224 lb cs kgs lb.	...	.15¾	...	.15¾	...	.15¾
White, 112 lb kgs lb.	.03	.04	.03	.04	.03	.04
Barium Carbonate precip, 200 lb bgs, wks ton	52.50	62.50	52.50	62.50	52.50	62.50
Nat (witherite) 90% gr, c-l, wks, bgs ton	41.00	43.00	41.00	44.00	42.00	45.00
Chlorate, 112 lb kgs, NY lb.	.16½	.17½	.16½	.17½	.16½	.17½
Chloride, 600 lb bbls, delv, zone 1 ton	77.00	92.00	77.00	92.00	74.00	92.00
Dioxide, 88%, 690 lb drs lb.	.11	.12	.11	.12	.11	.12
Hydrate, 500 lb bbls lb.	.04¾	.05½	.04¾	.05½	.04¾	.05½
Nitrate, bbls lb.	.07	.08¼	.07	.08¼	.07	.08¼
Barytes, floated, 350 lb bbls c-l, wks ton	...	23.65	...	23.65	...	23.65
Bauxite, bulk, mines ton	7.00	10.00	7.00	10.00	7.00	10.00
Bentonite, c-l, 325 mesh, bgs, wks ton	...	16.00	...	16.00	...	16.00
200 mesh ton	...	11.00	...	11.00	...	11.00
Benzaldehyde, tech, 945 lb drs, wks lb.	.60	.62	.60	.62	.60	.62
Benzene (Benzol), 90%, Ind, 8000 gal tks, ft all'd gal.	...	.16	...	.16	...	.16
90% c-l, drs gal.	...	.21	...	.21	...	.21
Ind pure, tks, frt all'd gal.	...	.16	...	.16	...	.16
Benzidine Base, dry, 250 lb bbls lb.	.70	.72	.70	.72	.70	.72
Benzoyl Chloride, 500 lb drs lb.	.40	.45	.40	.45	.40	.45
Benzyl Chloride, 95-97% rfd, drs lb.	.30	.40	.30	.40	.30	.40
Tech, drs lb.	.25	.26	.25	.26	.25	.26
Beta-Naphthol, 250 lb bbl, wks lb.	.23	.24	.23	.24	.23	.24
Naphthylamine, sublimed, 200 lb bbls lb.	1.25	1.35	1.25	1.35	1.25	1.35
Tech, 200 lb bbls lb.	.51	.52	.51	.52	.51	.52
Bismuth metal lb.	1.05	1.15	1.00	1.10	1.00	1.10
Chloride, boxes lb.	3.20	3.25	3.20	3.25	3.20	3.25
Hydroxide, boxes lb.	3.15	3.20	3.15	3.20	3.15	3.20
Oxychloride, boxes lb.	...	2.95	...	2.95	2.75	3.04
Subbenzoate, boxes lb.	3.25	3.30	3.25	3.30	3.25	3.30
Subcarbonate, kgs lb.	1.13	1.16	1.13	1.58	1.23	1.58
Trioxide, powd, boxes lb.	...	3.57	...	3.57	3.45	3.57
Subnitrate, fibre, drs lb.	1.03	1.06	1.03	1.48	1.22	1.48
Blackstrap, cane (see Molasses, Blackstrap).						
Blanc Fixe, 400 lb bbls, wks ton *h*	40.00	75.00	40.00	75.00	40.00	75.00
Bleaching Powder, 800 lb drs, c-l, wks, contract 100 lb.	...	2.00	...	2.00	...	2.00
lcl, drs, wks lb.	2.25	3.60	2.25	3.60	2.25	3.60
Blood, dried, f.o.b., NY unit	2.75	2.85	2.50	3.10	3.10	4.30
Chicago, high grade unit	2.75	3.00	2.35	3.35	3.00	4.65
Imported shipt unit	...	3.20	2.90	3.45	3.25	4.10
Blues, Bronze Chinese Milori						
Prussian Soluble lb.	.36	.37	.36	.37	.36	.37
Ultramarine,* dry, wks, bbls lb.	...	.11	...	.11	.10	.11
Regular grade, group 1 lb.	...	.16	...	.16	.15	.16
Special, group 1 lb.	...	.19	...	.19	.18	.19
Pulp, No. 1 lb.	...	.27	...	.27	.26	.27
Bone, 4½ + 50% raw, Chicago ton	...	25.50	25.50	30.00	26.00	30.00
Bone Ash, 100 lb kgs lb.	.06	.07	.06	.07	.06	.07
Black, 200 lb bbls lb.	.06½	.08¼	.06½	.08¼	.05½	.08¼
Meal, 3% & 50%, imp ton	...	20.50	20.50	23.75	23.75	27.50
Domestic, bgs, Chicago ton	20.00	23.00	16.00	23.00	19.00	27.00
Borax, tech, gran, 80 ton lots, sacks, delv ton *i*	...	43.00	42.00	43.00	40.00	42.00
bbls, delv ton *i*	...	53.00	52.00	53.00	50.00	52.00

h Lowest price is for pulp, highest for high grade precipitated; *i* Crystals $6 per ton higher; USP, $15 higher in each case; * Freight is equalized in each case with nearest producing point.

		Current Market	1938 Low	1938 High	1937 Low	1937 High
Borax (continued):						
Tech, powd, 80 ton lots, sacks	ton *i*	47.00	...	47.00	45.00	47.00
bbls, delv	ton *i*	57.00	...	57.00	56.00	57.00
Bordeaux Mixture, drs	lb.	.11	.11	.11	.11½	.10½	.11
Bromine, cases	lb.	.30	.43	.30	.43	.30	.43
Bronze, Al, pwd, 300 lb drs	lb.	.90½	.92½	.90½	.92½	.80	1.50
Gold, blk	lb.	.45	.65	.45	.65	.40	.65
Butanes, com 16-32° group 3 tks	lb.	.02¼	.03¾	.02¼	.03¾	.02¼	.03¾
Butyl, Acetate, norm drs, frt allowed	lb.	.10	.10½	.10	.10½	.10	.10½
tks, frt allowed	lb.	...	.09	...	.09	...	.09
Secondary, tks, frt allowed	lb.	...	.07	...	.07	.07	.07½
drs, frt, allowed	lb.	.08	.08½	.08	.08½	.08	.09
Aldehyde, 50 gal drs, wks	lb.	.16½	.17½	.16½	.17½	.16½	.17½
Carbinol, norm drs, wks	lb.	.60	.75	.60	.75	.60	.75
Crotonate, norm, 55 and 110 gal drs, delv	lb.	...	.36	...	.36	...	...
Lactate	lb.	.22½	.23½	.22½	.23½	.22½	.23½
Oleate, drs, frt allowed	lb.	...	.25	...	.25	...	.25
Propionate, drs	lb.	.18	.18½	.18	.18½	.18	.18½
tks, delv	lb.	...	.17	...	.17	...	.17
Stearate, 50 gal drs	lb.	...	.26	...	.26	.25	.26
Tartrate, drs	lb.	.55	.60	.55	.60	.55	.60
Butyraldehyde, drs, lcl, wks	lb.	...	.35½	...	.35½	...	.35½
Cadmium Metal	lb.	...	1.20	1.20	1.60	1.05	1.60
Sulfide, orange, boxes	lb.	1.50	1.60	1.50	1.60	.90	1.60
Calcium, Acetate, 150 lb bgs c-l, delv	100 lb.	...	1.65	...	1.65	1.65	2.25
Arsenate, c-l, E. of Rockies, dealers, drs	lb.	.06¾	.07¼	.06¾	.07¼	.06¼	.07¾
Carbide, drs	lb.	.05	.06	.05	.06	.05	.06
Carbonate, tech, 100 lb bgs c-l	lb.	...	1.00	...	1.00	...	1.00
Chloride, flake, 375 lb drs, burlap bgs, c-l, delv	ton	...	22.00	22.00	23.50	22.00	23.50
paper bgs, c-l, delv	ton	23.00	36.00	23.00	36.00	...	...
Solid, 650 lb drs, c-l, delv	ton	...	20.00	20.00	21.50	20.00	21.50
Ferrocyanide, 350 lb bbls wks	lb.	...	.17	...	.17	...	.17
Gluconate, Pharm, 125 lb bbls	lb.	.50	.57	.50	.57	.50	.57
Levulinate, less than 25 bbl lots, wks	lb.	...	3.00	...	3.00	...	...
Nitrate, 100 lb bgs	ton	...	28.00	...	28.00	26.10	28.00
Palmitate, bbls	lb.	.22	.23	.22	.23	.22	.23
Phosphate, tribasic, tech, 450 lb bbls	lb.	.06½	.07½	.06½	.07½	.06½	.07½
Resinate, precip, bbls	lb.	.13	.14	.13	.14	.13	.14
Stearate, 100 lb bbls	lb.	.19	.21	.19	.21	.19	.21
Camphor, slabs	lb.	.52½	.53	.52½	.56	.54	.56
Powder	lb.	.52½	.53	.52½	.56	.54	.56
Camwood, Bk, ground bbls	lb.	.16	.18	.16	.18	.16	.18
Carbon Bisulfide, 500 lb drs	lb.	.05	.05¾	.05	.05¾	.05	.05¾
Black, c-l, bgs, delv, price varying with zone†	lb.	.027	.0380	.027	.0380	.0320	.0535
lcl, bgs, f.o.b. whse	lb.	...	.05¾	...	.05¾	.06½	.07
cartons, f.o.b. whse	lb.	...	.06¼	...	.06¼	.07	.07¾
cases, f.o.b. whse	lb.	...	.07	...	.07	.07¾	.08¼
Decolorizing, drs, c-l	lb.	.08	.15	.08	.15	.08	.15
Dioxide, Liq 20-25 lb cyl	lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, 55 or 110 gal drs, c-l, delv	lb.	.05¼	.06	.05¼	.06	.05¼	.06
Casein, Standard, Dom, grd	lb.	.08	.10½	.06½	.13½	.11	.20¾
80-100 mesh, c-l, bgs	lb.	.08½	.11	.07	.14	.11½	.21¼
Castor Pomace, 5½ NH_3, c-l, bgs, wks	ton	...	18.50	18.50	21.00	21.00	25.00
Imported, ship, bgs	ton	...	21.00	...	21.00	nom.	17.00
Celluloid, Scraps, ivory cs	lb.	.12	.15	.12	.15	.12	.15
Transparent, cs	lb.	...	.20	...	.20	...	.20
Cellulose, Acetate, 50 lb kgs	lb.	...	.40	...	.40	.40	.55
Chalk, dropped, 175 lb bbls	lb.	.03	.03¾	.03	.03¾	.03	.03¾
Precip, heavy, 560 lb cks	lb.	.03	.04	.03	.04	.03	.04
Light, 250 lb cks	lb.	.03¼	.04	.03¼	.04	.03	.04
Charcoal, Hardwood, lump, blk, wks	bu.	...	.15	...	.15	...	.15
Softwood, bgs, delv*	ton	23.00	34.00	23.00	34.00	23.00	34.40
Willow, powd, 100 lb bbl, wks	lb.	.06	.07	.06	.07	.06	.07
Chestnut, clarified, tks, wks	lb.	...	.02125	...	.02125	.01625	.02125
25%, bbls, wks	lb.	...	.0225	...	.0225	.02	.0225
Pwd, 60%, 100 lb bgs, wks	lb.	...	.04¾	...	.04¾	...	.04¾
China Clay, c-l, blk mines	ton	...	7.00	...	7.00	6.50	7.00
Imported, lump, blk	ton	22.00	25.00	22.00	25.00	22.00	25.00
Chlorine, cyls, lcl, wks, contract	lb.	.07½	.08½	.07½	.08½	.07½	.08½
cyls, c-l, contract	lb. *j*	...	.05½	...	.05½	...	.05½
Liq, tk, wks, contract 100 lb.		...	2.15	...	2.15	...	2.15
Multi, c-l, cyls, wks, cont	lb.	2.30	2.55	2.30	2.55	2.30	2.55
Chloroacetophenone, tins, wks	lb.	3.00	3.50	3.00	3.50	3.00	3.50
Chlorobenzene, Mono, 100 lb drs, lcl, wks	lb.	.06	.07½	.06	.07½	.06	.07½
Chloroform, tech, 1000 lb drs	lb.	.20	.21	.20	.21	.20	.21
USP, 25 lb tins	lb.	.30	.31	.30	.31	.30	.31
Chloropicrin; comml cyls	lb.	..	.80	...	.80	...	.80
Chrome, Green, CP	lb.	.21	.25	.21	.25	.20	.25
Yellow	lb.	.14½	.15½	.14½	.15½	.13	.16½

j A delivered price; * Depends upon point of delivery; † New bulk price, tank cars ¼c per lb. less than bags in each zone.



TURNER Chemicals are backed by 75 years of experience—insuring you a uniform product of the highest standard—yet priced to meet competition.

Caustic Potash
Caustic Soda
Potassium Carbonate
Oxalic Acid
Phosphorus Compounds
Sodium Chlorate
Bleaching Powder
Persulphate of Ammonia
Persulphate of Potash
Aluminum Stearate
Calcium Stearate
Zinc Stearate U. S. P.
White Oils
Petrolatum
Insecti-Sol
(Colorless, Odorless Insecticide Base)

LIQUID CAUSTIC SODA

We maintain local delivery tank truck service throughout the Metropolitan New York area.

JOSEPH TURNER & CO.
RIDGEFIELD, NEW JERSEY

83 Exchange Pl., Providence, R. I.; 630 Fifth Ave., New York, N. Y.
40th St. & Calumet Ave., Chicago, Ill.

Serving the Chemical Industry for over 75 years

CHEMICALS

KESSCOCIDE 95

ALPHA NAPHTHYL ISO-THIOCYANATE

A NEW SYNTHETIC INSECTICIDE

COLORLESS SOLUTIONS

ODORLESS

ECONOMICAL

NON STAINING

Inquiries Solicited

KESSCO PRODUCTS

THE KESSLER CHEMICAL CORPORATION

DELAWARE AVE. & MIFFLIN ST. PHILADELPHIA, PA.

FOOTE LITHIUM PRODUCTS

BENZOATE
CARBONATE
CHLORIDE
CITRATE
FLUORIDE
NITRATE

for

PHARMACEUTICALS
AIR CONDITIONING
CERAMIC GLAZES
GLASS AND ENAMEL
WELDING FLUXES

FOOTE MINERAL CO.

1603 Summer Street, Philadelphia, Pa.

Prices

	Current Market	1938 Low	1938 High	1937 Low	1937 High
Chromium, Acetate, 8% Chrome, bbls lb.	.05	.08	.05	.08	.05	.08
Fluoride, powd, 400 lb bbl lb.	.27	.28	.27	.28	.27	.28
Coal tar, bbls bbl.	7.50	8.00	7.50	8.00	6.75	9.00
Cobalt Acetate, bbls lb.	.66	.68	.66	.68	.58	.68
Carbonate tech, bbls lb.	...	1.63	...	1.63	1.42¾	1.63
Hydrate, bbls lb.	...	1.36	...	1.36	...	...
Linoleate, solid, bbls lb.	...	.33	...	.33	.31	.33
paste, 6%, drs lb.	...	.31	...	.31	...	.31
Oxide, black, bgs lb.	...	1.67	...	1.67	1.41	1.67
Resinate, fused, bbls lb.	...	.13½	...	.13½	.13	.13½
Precipitated, bbls lb.	...	.34	...	.34	.30½	.34
Cochineal, gray or bk bgs lb.	.35	.38	.35	.38	.32	.38
Teneriffe silver, bgs lb.	.36	.39	.36	.39	.33	.39
Copper, metal, electrol 100 lb.	...	9.25	9.00	11.00	11.00	16.25
Acetate, normal, bbls, wks lb.	.21	.23	.21	.23	...	...
Carbonate, 400 lb bbls lb.	...	.10¼	.10¼	.10½	.10½	.12½
52-54% bbls lb.	.1340	.1440	.1340	.16¾	.15¾	.19
Chloride, 250 lb bbls lb.	.12½	.13½	.12½	.17	.15	.18
Cyanide, 100 lb drs lb.	...	.34	.34	.38	.37	.38
Oleate, precip, bbls lb.	...	.20	...	.20	...	.20
Oxide, black, bbls, wks lb.	.14¼	.15¼	.13½	.17½	.17	.18
red 100 lb bbls lb.	...	.15¾	.15	.19775	.17	.19975
Resinate, precip, bbls lb.	.15	.16	.15	.16	.15	.19
Stearate, precip, bbls lb.	.23	.24	.23	.24	.23	.40
Sub-acetate verdigris, 400 lb bbls lb.	.18	.19	.18	.19	.18	.19
Sulfate, bbls, c-l, wks 100 lb.	...	4.15	4.00	4.25	4.25	4.50
Copperas, crys and sugar bulk c-l, wks ton	12.00	13.00	12.00	13.00	12.00	13.00
Corn Sugar, tanners, bbls 100 lb.	3.15	3.25	3.10	3.30	3.15	4.34
Corn Syrup, 42°, bbls 100 lb.	...	3.09	3.04	3.16	3.11	4.36
43°, bbls 100 lb.	...	3.14	3.09	3.21	3.16	4.41
Cotton, Soluble, wet, 100 lb bbls lb.	.40	.42	.40	.42	.40	.42
Cream Tartar, powd & gran, 300 lb bbls lb.	.22¾	.23¼	.19¾	.23¼	.15	.20¼
Creosote, USP, 42 lb cbys lb.	.45	.47	.45	.47	.45	.47
Oil, Grade 1, tks gal.	.13½	.14	.13½	.14	.13	.14
Grade 2 gal.	.122	.132	.122	.132	.113	.132
Cresol, USP, drs lb.	.10½	.11	.10½	.12½	.10	.13
Crotonaldehyde, 97%, 55 and 110 gal drs, delv lb.	...	.22	.22	.30	.26	.30
Cutch, Philippine, 100 lb bale lb.	.05¼	.06	.04	.06	.04	.04¾
Cyanamid, bgs, c-l, frt allowed Ammonia unit	...	1.15	...	1.15	1.10	1.15
Derris root 5% rotenone, bbls lb.	.34	.38	.34	.43	.39	.47
Dextrin, corn, 140 lb bgs f.o.b., Chicago 100 lb.	3.50	3.70	3.45	3.75	3.50	5.00
British Gum, bgs 100 lb.	3.75	3.95	3.70	4.00	3.75	5.25
Potato, Yellow, 220 lb bgs lb.	.07¼	.08¾	.07¼	.08¾	.07¾	.08¾
White, 220 lb bgs, lcl lb.	.08	.09	.08	.09	.08	.09
Tapioca, 200 bgs, lcl lb.	...	.0715	.0715	.08	...	.08
White, 140 lb bgs 100 lb.	3.45	3.65	3.45	3.70	4.00	4.58
Diamylamine, c-l, drs, wks lb.	.47	.75	.47	.75	.47	.75
Diamylene, drs, wks lb.	.095	.102	.095	.102	.095	.102
tks, wks lb.	...	.08½	...	.08¼	...	.08½
Diamylether, wks, drs lb.	.085	.092	.085	.092	.085	.092
tks, wks lb.	...	.075	...	.075	...	.075
Oxalate, lcl, drs, wks lb.	...	.30	...	.30	...	.30
Diamylphthalate, drs, wks lb.	.20½	.21	.20½	.21	.19	.21½
Diamyl Sulfide, drs, wks lb.	...	1.10	...	1.10	...	1.10
Diatomaceous Earth, see Kieselguhr.						
Dibutoxy Ethyl Phthalate, drs, wks lb.	...	.35	...	.35	...	.35
Dibutylamine, lcl, drs, wks lb.	...	.55	...	.55	...	...
Dibutyl Ether, drs, wks, lcl lb.	...	.30	...	.30	...	.30
Dibutylphthalate, drs, wks, frt all'd lb.	...	.21	...	.21	.19½	.21
Dibutyltartrate, 50 gal drs lb.	.45	.54	.45	.54	.35	.50
Dichlorethylene, drs lb.	...	.25	...	.25	.25	.29
Dichloroethylether, 50 gal drs, wks lb.	.15	.16	.15	.16	.15	.16
tks, wks lb.	...	.14	...	.14	...	.14
Dichloromethane, drs, wks lb.	...	.23	...	.23	...	.23
Dichloropentanes, drs, wks lb.	no prices		...	...	...	...
tks, wks lb.	no prices		...	...	...	...
Diethanolamine, tks, wks lb.	...	.23	...	.23	.23	.25
Diethylamine, 400 lb drs lb.	2.75	3.00	2.75	3.00	2.75	3.00
Diethylaniline, 850 lb drs lb.	.40	.52	.40	.50	.40	.50
Diethyl Carbinol, drs lb.	.60	.75	.60	.75	.60	.75
Diethylcarbonate, com drs lb.	.31¾	.35	.31¾	.35	.31¾	.35
Diethylorthotoluidin, drs lb.	.64	.67	.64	.67	.64	.67
Diethylphthalate, 1000 lb drs lb.	.19	.19½	.19	.19½	.18	.19½
Diethylsulfate, tech, drs, wks, lcl lb.	.13	.14	.13	.14	.13	.20
Diethyleneglycol, drs lb.	.16	.17	.16	.17	.16	.23
Mono ethyl ethers, drs lb.	.15	.16	.15	.16	.15	.17
tks, wks lb.	...	.14	...	.14	.14	.15
Mono butyl ether, drs lb.	.23	.24	.23	.24	.23	.26
tks, wks lb.	...	.22	...	.22	...	...
Diethylene oxide, 50 gal drs, wks lb.	.20	.24	.20	.24	.20	.24
Diglycol Oleate, bbls lb.	...	.21	...	.21	.21	.24
Laurate, bbls lb.	...	.27½	...	.27½	...	...
Stearate, bbls lb.	...	.27½	...	.27½	...	...
Dimethylamine, 400 lb drs, pure 25 & 40% sol 100% basis lb.	...	1.00	...	1.00	...	.95
Dimethylaniline, 340 lb drs lb.	.26	.27	.26	.27	.26	.27
Dimethyl Ethyl Carbinol, drs lb.	.60	.75	.60	.75	.60	.75
Dimethyl phthalate, drs, wks, frt allowed lb.	...	.19	...	.19	.20½	.21
Dimethylsulfate, 100 lb drs lb.	.45	.50	.45	.50	.45	.50
Dinitrobenzene, 400 lb bbls lb. k	.16	.19	.16	.19	.16	.19

k Higher price is for purified material.

		Current Market	1938 Low	1938 High	1937 Low	1937 High
Dinitrochlorobenzene, 400 lb bbls	lb.	.13½	.13½	.14	.14	.17½
Dinitronaphthalene, 350 lb bbls	lb.	.35	.35	.38	.35	.38
Dinitrophenol, 350 lb bbls	lb.	.23	.23	.24	.23	.24
Dinitrotoluene, 300 lb bbls	lb.	...	...	.15½	.14½	.15½
Diphenyl, bbls	lb.	.15	.15	.25	.15	.25
Diphenylamine	lb.	.31	.31	.32	.31	.32
Diphenylguanidine, 100 lb drs	lb.	.35	.35	.37	.35	.37
Dip Oil, see Tar Acid Oil.						
Divi Divi pods, bgs shipmt	ton	...	...	nom.	34.00	nom.
Extract	lb.	.05	.05	.05½	.05	.05½
EGG YOLK						
Egg Yolk, dom., 200 lb cases	lb.	.62	.60	.68	.68	nom.
Imported	lb.	.62	.62	.68	.53	.65
Epsom Salt, tech, 300 lb bbls						
c-l, NY	100 lb.	1.90	1.90	2.10	1.80	2.10
USP, c-l, bbls	100 lb.	...	...	2.10	2.00	2.10
Ether, USP anaesthesia 55 lb drs	lb.	.22	.22	.23	.22	.23
(Conc)	lb.	.09	.09	.10	.09	.10
Isopropyl 50 gal drs	lb.	.07	.07	.08	.07	.08
tks, frt allowed	lb.	...	...	.06	...	.06
Nitrous, conc, bottles	lb.	...	...	.68	.68	.77
Synthetic, wks, drs	lb.	.08	.08	.09	.08	.09
Ethyl Acetate, 85% Ester tks, frt all'd	lb.	...	...	.05½	.05½	.06½
drs, frt all'd	lb.	...	...	.06½	.06½	.07½
95%, tks, frt allowed	lb.	...	...	.06¾	...	.06¾
drs, frt all'd	lb.	...	...	.07¾	...	.07¾
Acetoacetate, 110 gal drs	lb.	...	...	.27½	...	.27½
Benzylaniline, 300 lb drs	lb.	.86	.86	.88	.86	.88
Bromide, tech, drs	lb.	.50	.50	.55	.50	.55
Cellulose, drs, wks, frt all'd	lb.	.6440	.6440	1.00	...	...
Chloride, 200 lb drs	lb.	.22	.22	.24	.22	.24
Chlorocarbonate, cbys	lb.	...	...	.30	...	.30
Crotonate, drs	lb.	1.00	1.00	1.25	1.00	1.25
Formate, drs, frt all'd	lb.	.27	.27	.28	.27	.31
Lactate, drs, wks	lb.	...	...	.33	...	.33
Oxalate, drs, wks	lb.	.30	.30	.34	.30	.34
Oxybutyrate, 50 gal drs, wks	lb.	.30	.30	.30½	.30	.30½
Silicate, drs, wks	lb.	...	...	.77	...	.77
Ethylene Dibromide, 60 lb drs	lb.	.65	.65	.70	.65	.70
Chlorhydrin, 40%, 10 gal cbys chloro, cont	lb.	.75	.75	.85	.75	.85
Anhydrous	lb.	...	...	.75	...	.75
Dichloride, 50 gal drs, wks	lb.	.0545	.0545	.0994	.0545	.0994
Glycol, 50 gal drs, wks	lb.	.17	.17	.21	.17	.21
tks, wks	lb.	...	...	.16	...	.16
Mono Butyl Ether, drs, wks	lb.	.20	.20	.21	.20	.21
tks, wks	lb.	...	...	.19	...	.19
Mono Ethyl Ether, drs, wks	lb.	.16	.16	.17	.16	.17
tks, wks	lb.	...	...	.15	...	.15
Mono Ethyl Ether Acetate, drs, wks	lb.	...	...	.14	...	.14
tks, wks	lb.	...	...	.13	...	13
Mono, Methyl Ether, drs wks	lb.	.18	.18	.22	.18	.22
tks, wks	lb.	...	...	.17	...	.17
Oxide, cyl	lb.	.50	.50	.55	.50	.55
Ethylidenaniline	lb.	.45	.45	.47½	.45	.47½
Feldspar, blk pottery	ton	17.00	17.00	19.00	...	14.50
Powd, blk, wks	ton	14.00	14.00	14.50	14.00	14.50
Ferric Chloride, tech, crys, 475 lb bbls	lb.	.05	.05	.07½	.05	.07½
sol, 42° cbys	lb.	.06¼	.06¼	.06½	.06¼	.06½
Fish Scrap, dried, unground, wks	unit *l*	...	2.75	3.00	...	...
Acid, Bulk, 6 & 3%, delv Norfolk & Baltimore basis	unit *m*	...	2.50	2.50	2.75	3.15
Fluorspar, 98%, bgs	lb.	...	...	33.00	no prices	
Formaldehyde, USP, 400 lb bbls, wks	lb.	.05¾	.05¾	.06¼	.05¾	.06¼
Fossil Flour	lb.	.02½	.02½	.04	.02¼	.04
Fullers Earth, blk, mines	ton	10.00	10.00	11.00	6.50	15.00
Imp powd, c-l, bgs	ton	23.00	23.00	30.00	23.00	30.00
Furfural (tech) drs, wks	lb.	.10	.10	.15	.10	.15
Furfuramide (tech) 100 lb drs	lb.	...	...	.30	...	.30
Fusel Oil, 10% impurities	lb.	.12½	.12½	.14	.12½	.18
Fustic, crystals, 100 lb boxes	lb.	.22	.22	.26	.20	.26
Liquid 50°, 600 lb bbls	lb.	.09½	.09½	.13	.08½	.13
Solid, 50 lb boxes	lb.	.17½	.17½	.19½	.16	.19½
G SALT PASTE						
G Salt paste, 360 lb bbls	lb.	.45	.45	.47	.45	.47
Gall Extract	lb.	.19	.19	.20	.19	.20
Gambier, com 200 lb bgs	lb.	.06¾	.06¾	.07¾	...	nom.
Singapore cubes, 150 lb bgs	100 lb.	.10½	.10½	.11	.09½	.10½
Gelatin, tech, 100 lb cs	lb.	.45	.45	.50	.45	.55
Glauber's Salt, tech, c-l, bgs, wks*	100 lb.	.95	.95	1.15	.95	1.15
Anhydrous, see Sodium Sulfate.						
Glue, bone, com grades, c-l bgs	lb.	.13	.13	.16½	.11	.17½
Better grades, c-l, bgs	lb.	.14½	.14½	.16½	.12½	.17½
Casein, kgs	lb.	.18	.18	.22	.18	.22

l + 10; *m* + 50; *Bbls. are 20c higher.

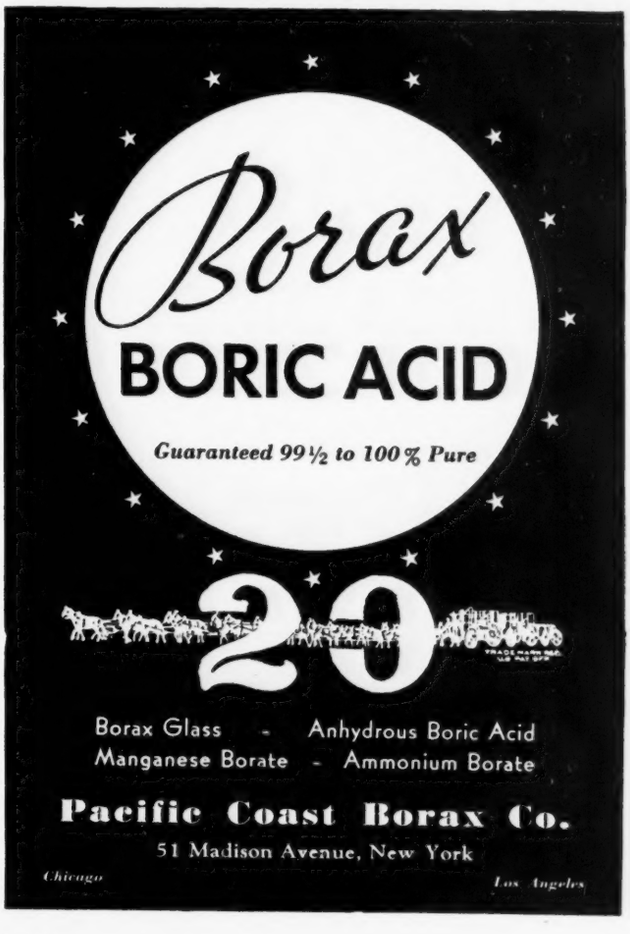
Our position, in the chemical industry, is that of an intimate consultant as well as a manufacturer. We like actual and prospective customers to consider us a private laboratory where problems may be worked out in a seclusion that is not violated by ordinary business gossip and rumors. We welcome inquiries pertaining to our business.

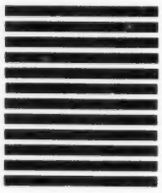
Oldbury Electro-Chemical Company

Plant and Main Office:
Niagara Falls, New York

New York Office: 22 E. 40th St., New York City

Phosphorus and phosphorus products. Sodium chlorate. Potassium perchlorate. Oxalic acid





FORTY-SIX YEARS
THE STANDARD OF QUALITY

HARSHAW CHEMICALS

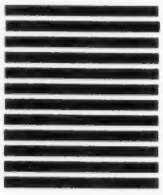
THE HARSHAW CHEMICAL CO.

Manufacturers, Importers, Merchants
Offices and Laboratories: Cleveland, Ohio

Quality products since 1892

New York, Philadelphia, Chicago, Detroit, Pittsburgh, Cincinnati, East Liverpool, Los Angeles, San Francisco

Works at Cleveland and Elyria, Ohio, and Philadelphia, Pa.



GUMS

GUM ARABIC

GUM KARAYA
(INDIAN GUM)

GUM TRAGACANTH

LOCUST BEAN GUM
(CAROB FLOUR)

• • •

JAPAN WAX

NEW ENGLAND REP.
G. H. BUNTON
CAMBRIDGE, MASS.

PHILADELPHIA REP.
R. PELTZ & CO.
112 SO. 16TH ST.

PAUL A. DUNKEL & CO.,
INCORPORATED

Let us quote on your requirements

82 WALL ST.
NEW YORK, N.Y.

Glycerin
Gum, Hemlock

Prices

		Current Market	1938 Low	1938 High	1937 Low	1937 High
Glycerin, CP, 550 lb drs	lb.	...	.14¼	.14¼	.16	.15½	.29
Dynamite, 100 lb drs	lb.	.12¾	.13¼	.12¾	.16	.15½	.29
Saponification, drs	lb.	.09½	.09¾	.09½	.11¼	.11	.29
Soap Lye, drs	lb.	.08½	.08¾	.08½	.10¼	.10	.27
Glyceryl Bori-Borate, bbls	lb.	...	.40	...	.40	...	...
Monoricinoleate, bbls	lb.	...	.27	...	.27	...	...
Monostearate, bbls	lb.	...	.30	...	.30	...	...
Oleate, bbls	lb.	...	.22	...	.22	...	...
Phthalate	lb.	...	.37	...	.37	.29	.37
Glyceryl Stearate, bbls	lb.	...	.18	...	.18	...	.18
Glycol Bori-Borate, bbls	lb.	...	.26	...	.26	...	...
Phthalate, drs	lb.	...	.40	...	.40	.29	.40
Stearate, drs	lb.	...	.27½	...	.27½	.23	.27½
GUMS							
Gum Aloes, Barbadoes	lb.	.85	.90	.85	.90	.85	.90
Arabic, amber sorts	lb.	.10¼	.10¾	.10¼	.12	.10½	.15½
White sorts, No. 1, bgs	lb.	.27	.28	.24	.28	.24	.30
No. 2, bgs	lb.	.25	.26	.22	.26	.22	.28
Powd, bbls	lb.	.13½	.14	.13½	.16	.14	.19
Asphaltum, Barbadoes (Manjak) 200 lb bgs, f.o.b., NY	lb.	02½	.10½	.02½	.10½	.02½	.10½
California, f.o.b., NY, drs	ton	29.00	55.00	29.00	55.00	29.00	55.00
Egyptian, 200 lb cases, f.o.b., NY	lb.	.12	.15	.12	.15	.12	.15
Benzoin Sumatra, USP, 120 lb cases	lb.	.17½	.19	.15	.20	.15	.25
Copal, Congo, 112 lb bgs, clean, opaque	lb.	...	.18¾	.18¾	.19¼	.18⅞	.19¼
Dark amber	lb.	...	.08¼	.08¼	.08⅞	.06⅞	.09¼
Light amber	lb.	...	.11⅞	.11⅞	.13¼	.10¼	.14⅜
Copal, East India, 180 lb bgs							
Macassar pale bold	lb.	...	.12⅛	.12⅛	.13	...	.13
Chips	lb.	...	.05⅜	...	.05⅜	.05⅜	.06½
Dust	lb.	.03¼	.04	.03½	.04⅛	.03⅝	.04⅛
Nubs	lb.	...	.10⅜	...	.10⅜	.10⅜	.11¼
Singapore, Bold	lb.	...	.14½	.14½	.15¼	.15¼	.15⅝
Chips	lb.	...	.04¾	...	.04¾	.04¼	.05
Dust	lb.	.03¼	.04	.03¼	.04⅛	.03⅝	.04⅛
Nubs	lb.	...	.10	...	.10	.10	.10¾
Copal Manilla, 180-190 lb baskets, Loba A	lb.	...	.12	...	.12	.09¾	.12
Loba B	lb.	...	.11	.11	.11⅝	.09¼	.11⅝
Loba C	lb.	...	.10⅛	.10⅛	.11¼	.08⅞	.11¼
DBB	lb.	...	.08	.08	.08¾	.08	.08¾
Dust	lb.	...	.05⅞	.05⅞	.06⅝	.05¾	.06⅝
MA sorts	lb.	...	.05⅞	.05⅞	.07¼	.06¾	.07¼
Copal Pontianak, 224 lb cases, bold genuine	lb.	...	.16½	...	.16½	.15½	.16½
Chips	lb.	...	.09⅜	.09⅜	.10¼	.09⅛	.11⅜
Mixed	lb.	...	.14	...	.14	.13½	.14
Nubs	lb.	...	.12¼	.12¼	.12⅞	.12¾	.13½
Split	lb.	...	.13⅞	...	.13⅞	.13½	.15¼
Dammar Batavia, 136 lb cases							
A	lb.	...	.21¾	.21¾	.25½	.23½	.25½
B	lb.	...	.20¼	.20¼	.24	.22⅛	.24
C	lb.	...	.16⅝	.16⅝	.20⅜	.18½	.20⅜
D	lb.	...	.13¾	.13¾	.17½	.15¼	.17½
A/D	lb.	...	.16⅜	.16⅜	.20⅜	.17⅝	.20⅜
A/E	lb.	...	.13⅝	.13⅝	.17¼	.14⅞	.17¼
E	lb.	...	.07⅜	.07⅜	.08½	.07½	.08½
F	lb.	...	.07¼	...	.07¼	.06¼	.07¼
Singapore, No. 1	lb.	...	.17¾	.17¾	.21⅞	.17⅛	.21½
No. 2	lb.	...	.11¾	.11¾	.15⅜	.14⅛	.16¼
No. 3	lb.	...	.05½	.05½	.05¾	...	.05¾
Chips	lb.	...	.11⅝	.11⅝	.13½	.10¼	.13½
Dust	lb.	...	.05¼	.05¼	.05¾	.05¾	.06
Seeds	lb.	...	.08¼	.08¼	.09½	.07⅛	.09½
Elemi, cns., c.l.	lb.	...	.08⅛	.08⅛	.09½	.09⅜	.10¼
Ester	lb.	.06¾	.07½	.06¾	.08½	.09	.12
Gamboge, pipe, cases	lb.	.65	.70	.65	.80	.58	.80
Powd, bbls	lb.	.70	.75	.70	.85	.65	.85
Ghatti, sol. bgs	lb.	.11	.15	.11	.15	.11	.15
Karaya, powd, bbls, xxx	lb.	.27	.30	.27	.30	.24	.30
xx	lb.	.18	.19	.18	.19	.16	.19
No. 1	lb.	.12	.13	.12	.13	.09½	.13
No. 2	lb.	.11	.12	.11	.12	.08½	.12
Kauri, NY, San Francisco, Brown XXX, cases	lb.	.60	.60½	.60	.60½	.60	.60½
BX	lb.	...	.38	...	.38	.33	.38
B1	lb.	...	.28	...	.28	.21	.28
B2	lb.	...	.24	...	.24	.15½	.26
B3	lb.	...	.18½	...	.18½	.12	.18½
Pale XXX	lb.	...	.61	...	.61	.61	.65½
No. 1	lb.	...	.41	...	.41	.40	.41
No. 2	lb.	...	.24	...	.24	.22	.24
No. 3	lb.	...	.17¼	...	.17¼	.15	.17¼
Kino, tins	lb.	2.50	2.75	2.00	2.75	.70	2.10
Mastic	lb.	.55	.56	.55	.56	.55	.58
Sandarac, prime quality, 200 lb bgs & 300 lb cks	lb.	.25	.26	.24	.26	.25	.35
Senegal, picked bags	lb.	.25	.27	.23	.27	.20	.29
Sorts	lb.	.10¼	.10½	.10¼	.12	.09¾	.15
Thus, bbls	280 lbs.	...	14.00	13.50	14.00	12.00	14.00
Strained	280 lbs.	...	14.00	...	14.00	12.00	14.00
Tragacanth, No. 1, cases	lb.	2.65	2.70	2.65	3.00	2.40	3.25
No. 2	lb.	2.35	2.40	2.35	2.75	2.00	2.75
No. 3	lb.	2.30	2.35	2.30	2.70	1.95	2.70
No. 4	lb.	2.25	2.30	2.25	2.65	1.85	2.65
No. 5	lb.	2.20	2.25	2.20	2.50	1.65	2.50
Yacca, bgs	lb.	.03½	.04½	.03½	.04½	.03¼	.04½
Helium, cyl (200 cu. ft.)	cyl.	...	25.00	...	25.00	...	25.00
Hematine crystals, 400 lb bbls	lb.	.18	.34	.18	.34	.16	.34
Hemlock, 25%, 600 lb bbls, wks	lb.	.03	.03¼	.03	.03¼	.03	.03¼
tks	lb.	...	.02¾	...	.02¾	...	.02¾

Current

Hexalene
Manganese Sulfate

	Current Market	1938 Low	1938 High	1937 Low	1937 High
Hexalene, 50 gal drs, wks lb.	...	.30	...	.30	...	.30
Hexane, normal 60-70° C. Group 3, tks gal.	...	.10½	...	.10½	...	.10½
Hexamethylenetetramine, powd, drs lb.	.35	.36	.35	.36	.35	.36
Hexyl Acetate, secondary, delv, drs lb.	.13	.13½	.13	.13½	.13	.13½
tks lb.	...	.12	...	.12	...	.12
Hoof Meal, f.o.b. Chicago unit	...	2.35	2.35	3.35	3.20	3.75
Hydrogen Peroxide, 100 vol, 140 lb cbys lb.	.19½	.20	.19½	.20	.20	.21
Hydroxylamine Hydrochloride lb.	...	3.15	...	3.15	...	3.15
Hypernic, 51°, 600 lb bbls lb.	.16	.21	.16	.21	.15	.21
INDIGO						
Indigo, Bengal, bbls lb.	....	2.40	...	2.40	...	2.40
Synthetic, liquid lb.	.16½	.19	.16½	.19	.16½	.19
Iodine, Resublimed, kgs lb.	1.50	1.60	1.50	1.60	1.50	1.60
Irish Moss, ord, bales lb.	.10	.11	.10	.11	.11	.12
Bleached, prime, bales lb.	.19	.20	.19	.20	.19	.21
Iron Acetate Liq. 17°, bbls, delv lb.	.03	.04	.03	.04	.03	.04
Chloride see Ferric Chloride.						
Nitrate, coml, bbls 100 lb.	2.32	3.11	2.32	3.11	2.32	3.25
Isobutyl Carbinol (128-132° C) drs, wks lb.	.33	.34	.33	.34	.33	.34
tks, wks lb.	...	.32	...	.32	...	.32
Isopropyl Acetate, tks, frt all'd lb.	...	.05½	...	.05½	.05½	.06½
drs, frt all'd lb.	.06½	.07	.06½	.07	.06½	.08
Ether, see Ether, isopropyl.						
Keiselguhr, dom bags, c-l, Pacific Coast ton	22.00	85.00	22.00	85.00	22.00	85.00
LEAD ACETATE						
Lead Acetate, f.o.b. NY, bbls, White, broken lb.	...	.10	.10	.11	.11	.13½
cryst, bbls lb.	...	.10	.10	.11	.11	.13½
gran, bbls lb.	...	.10¾	.10¾	.11¾	.11¾	.14¼
powd, bbls lb.	...	.10¾	.10¾	.11¾	.11¾	.14¼
Arsenate, East, drs lb.	.12½	.13	.12½	.13½	.11	.13½
Linoleate, solid, bbls lb.	...	.19	...	.19	.18	.19
Metal, c-l, NY 100 lb.	...	4.75	4.00	4.90	4.75	7.05
Nitrate, 500 lb bbls, wks lb.	.10	.11½	.10	.11½	.09	.11½
Oleate, bbls lb.	.18½	.20	.18½	.20	.15	.20
Red, dry, 95% Pb_3O_4, delv lb.	...	.07¼	.06½	.074	.07¼	.0945
97% Pb_3O_4, delv lb.	...	.07½	.06¾	.0765	.07½	.09¾
98% Pb_3O_4, delv lb.	...	.07½	.07	.0790	.07¾	.10
Resinate, precip, bbls lb.	...	.16½	...	.16½	.14	.16½
Stearate, bbls lb.	.22	.23	.22	.23	.22	.23
Titanate, bbls, c-l, f.o.b. wks, frt all'd lb.	.11	.11½	.11	.11½	.10	.12
White, 500 lb bbls, wks lb.	...	.06	.06	.06¾	.06¾	.09
Basic sulfate, 500 lb bbls, wks lb.	...	.05¼	.05¼	.06¼	.06¼	.08¾
Lime, chemical quicklime, f.o.b., wks, bulk ton	7.00	8.00	7.00	8.00	6.00	8.00
Hydrated, f.o.b., wks ton	8.50	12.00	8.50	12.00	8.00	12.00
Lime Salts, see Calcium Salts.						
Lime sulfur, dealers, tks gal.	.08	.11½	.08	.11½	...	.11
drs gal.	.11	.16	.11	.16	.13	.16
Linseed Meal, bgs ton	...	44.00	39.00	45.00	35.00	42.50
Litharge, coml, delv, bbls lb.	...	.06¾	.05½	.06¾	.06¼	.08½
Lithopone, dom, ordinary, delv, bgs lb.	...	.04⅛	.04⅛	.04⅝	.04¼	.04⅝
bbls lb.	...	.04⅜	.04⅜	.04⅞	.04½	.04⅞
High strength, bgs lb.	...	.05⅝	.05⅝	.06⅛	.05¾	.06⅛
bbls lb.	...	.05⅞	.05⅞	.06⅜	.06	.06⅜
Titanated, bgs lb.	...	.05⅝	.05⅝	.06⅛	.05¾	.06⅛
bbls lb.	...	.05⅞	.05⅞	.06⅜	.06	.06⅜
Logwood, 51°, 600 lb bbls lb.	.09½	.11½	.09½	.11½	.08½	.11½
Solid, 50 lb boxes lb.	.15	.19	.15	.19	.15	.17½
Sticks ton	24.00	25.00	24.00	25.00	24.00	25.00
MADDER						
Madder, Dutch lb.	.22	.25	.22	.25	.22	.25
Magnesite, calc, 500 lb bbl ton	60.00	65.00	60.00	65.00	60.00	65.00
Magnesium Carb, tech, 70 lb bgs, wks lb.	.05¾	.06½	.05¾	.07	.06	.07
Chloride flake, 375 lb drs, c-l, wks ton	39.00	42.00	39.00	42.00	39.00	42.00
Fluosilicate, crys, 400 lb bbls, wks lb.	.10	.10½	.10	.10½	.10	.10½
Oxide, calc tech. heavy bbls, frt all'd lb.	.25	.30	.25½	.30½	...	...
Light, bbls, above basis lb.	.20	.25	.20	.25½	...	...
USP Heavy, bbls, above basis lb.	.25	.30	.25	.30½	...	...
Palmitate, bbls lb.	.33	nom.	...	.33	.33	nom.
Silicofluoride, bbls lb.	.09½	.10½	.09½	.10½	.09½	.10½
Stearate, bbls lb.	.21	.24	.21	.24	.21	.24
Manganese acetate, drs lb.	...	.26½	...	.26½	.25½	.26½
Borate, 30%, 200 lb bbls lb.	.15	.16	.15	.16	.15	.16
Chloride, 600 lb cks lb.	.09	.12	.09	.12	.09	.12
Dioxide, tech (peroxide), paper bgs, c-l ton	...	57.50	57.50	62.50	47.50	62.50
Hydrate, bbls lb.	...	.32	...	.32	...	.32
Linoleate, liq, drs lb.	.18	.19¼	.18	.19¼	.18	.19¼
solid, precip, bbls lb.	...	.19	...	.19	.17½	.19
Resinate, fused, bbls lb.	.08¼	.08½	.08¼	.08½	.08¼	.08½
precip, drs lb.	...	.12	...	.12	...	.12
Sulfate, tech, anhyd, 90-95%, 550 lb drs lb.	.07	.07½	.07	.07½	.07	.07½



BEACON

ZINC STEARATE

MAGNESIUM STEARATE

High Grade Materials
That Merit Your Consideration

THE BEACON COMPANY

89 Bickford Street **Boston, Mass.**

Send for our booklet "Protective Colloids and Emulsions"

LEAD ACETATE

DELIVERIES FROM SPOT STOCKS

JUNGMANN & CO.
INCORPORATED
Industrial and Fine Chemicals-Raw Materials
157 CHAMBERS STREET
TEL. BARCLAY 7-5128-30 NEW YORK CITY

GREEFF

Industrial and Pharmaceutical Chemicals

METHYL
ETHYL
KETONE

Selling Agents for SHELL CHEMICAL COMPANY

R.W. GREEFF & CO.
10 East 40th Street, New York

MINERAL OIL RESIDUES

Naphthenic Soaps
Naphthenic Acid Sludges

Specifications Upon Request

S. SCHWABACHER & CO., INC.
IMPORTERS
25 Beaver Street, New York

Established Distributors Wanted—Inquiries Invited

SAVING BY SOLVENT RECOVERY

The Acticarbone Process gives high yield . . . with sound economy . . . and absolute safety ● More than 600 installations now in operation in 24 countries ● For information, proof and technical advice, address

ACTICARBONE CORPORATION
62 East 42d Street New York

ACTICARBONE

Mangrove
Octyl Acetate

Prices

		Current Market	1938 Low	1938 High	1937 Low	1937 High
Mangrove, 55%, 400 lb bbls	lb.	.04	.04	.04	.04	.04
Bark, African	ton	25.00	25.50	25.50	25.00	27.00
Mannitol, pure cryst, cs, wks	lb.	1.30	1.30	1.45	1.45	1.48
Marble Flour, blk	ton	12.00	13.00	13.00	12.00	13.00
Mercury chloride (Calomel)	lb.	1.28	1.18	1.59	1.05	1.60
Mercury metal . . . 76 lb. flasks		80.00	82.50	71.00	83.50	81.00	99.00
Meta-nitro-aniline	lb.	.67	.69	.67	.69	.67	.69
Meta-nitro-paratoluidine 200 lb bbls	lb.	1.45	1.55	1.45	1.55	1.45	1.55
Meta-phenylene diamine 300 lb bbls	lb.	.80	.84	.80	.84	.80	.84
Meta-toluene-diamine, 300 lb bbls	lb.	.65	.67	.65	.67	.65	.67
Methanol, denat, grd, drs, c-l, frt all'd	gal.	...	.31	.31	.36	.36	.53
tks, frt all'd	gal.	...	.25	.25	.30	.30	.48
Pure, drs, c-l, frt all'd	gal.	...	.38	...	.38	..	.38
tks	gal.	...	.33	...	.33	...	.33
95%, tks	gal.	...	.31	...	.31	...	.31
97%, tks	gal.	...	.32	...	.32	..	.32
Methyl Acetate, tech, tks, delv	lb.	...	.06½	...	.06½	...	...
55 gal drs, delv	lb.	.07½	.08	.07½	.08	...	...
C.P. 97-99%, tks, delv	lb.	...	.07	...	.07	...	...
55 gal drs, delv	lb.	.08	.08½	.08	.08½	...	...
Acetone, frt all'd, drs	gal. ρ	.30	.36	.30	.40½	.34½	.58½
tks, frt all'd, drs	gal. ρ	.25	.29	.25	.32½	.28½	.44½
Synthetic, frt all'd, east of Rocky M., drs	gal. ρ	.42	.51	.42	.51	.42	.59½
tks, frt all'd	gal.	.36	.39½	.36	.39½	.36	.49½
West of Rocky M., frt all'd, drs	gal. ρ	...	.46	...	.46	.46	.58
tks, frt all'd	gal. ρ	...	.39½	...	.39½	.39½	.51
Anthraquinone	lb.	.65	.67	.65	.67	.65	.67
Butyl Ketone, tks	lb.	...	.10½	...	.10½	...	.10½
Chloride, 90 lb cyl	lb.	.32	.40	.32	.40	.32	.43
Ethyl Ketone, tks, frt all'd	lb.	...	.05½	.05½	.06	...	.07½
50 gal drs, frt all'd c-l	lb.	...	.06½	.06½	.07	...	...
Formate, drs, frt all'd	lb.	.35	.36	.35	.36	.35	.39
Hexyl Ketone, pure, drs	lb.	...	.60	...	.60	...	.60
Lactate, drs, frt all'd	lb.	...	.30	...	.30	...	.30
Propyl carbinol, drs	lb.	.60	.75	.60	.75	.60	.75
Mica, dry grd, bgs, wks	lb.	...	35.00	...	35.00	...	35.00
Michler's Ketone, kgs	lb.	...	2.50	...	2.50	...	2.50
Molasses, blacksrap, tks, f.o.b. NY	gal.	...	.07	...	.07	.07	.07¼
Monoamylamine, c-l, drs, wks	lb.	.52	1.00	.52	1.00	.52	1.00
Monobutylamine, lcl, drs, wks	lb.	...	.65	...	.65	...	...
Monochlorobenzene, see Chlorobenzene, mono.							
Monoethanolamine, tks, wks	lb.	...	.23	...	.23	.25	.30
Monomethylamine, drs, frt all'd, E. Mississippi, c-l	lb.	...	.65	...	.65	...	.65
Monomethylparaminosulfate, 100 lb drs	lb.	3.75	4.00	3.75	4.00	3.75	4.00
Myrobalans 25%, liq bbls	lb.	.03¾	.04¼	.03¾	.04¼	..	.04¼
50% Solid, 50 lb boxes	lb.	.04⅜	.05	.04⅜	.06¼	.06	.06¼
J1 bgs	ton	...	27.00	27.00	30.00	26.50	30.00
J2 bgs	ton	...	20.00	20.00	22.00	19.00	22.50
R2 bgs	ton	...	19.50	19.50	22.00	18.75	22.00
NAPHTHA							
Naphtha, v.m.&p. (deodorized) see petroleum solvents.							
Naphtha, Solvent, water-white, tks	gal.	...	.26	.26	.31	...	.31
drs, c-l	gal.	...	.31	.31	.36	...	.36
NAPHTHALENE							
Naphthalene, dom, crude, bgs, wks	lb.	2.35	2.70	2.35	2.70	2.00	3.00
Imported, cif, bgs	lb.	1.70	2.15	1.70	2.25	2.20	3.00
Balls, flakes, pks	lb.	...	.07½	.07½	.08	...	.08
Balls, ref'd, bbls, wks	lb.	...	.06¾	.06¾	.07¼	...	.07¼
Flakes, ref'd, bbls, wks	lb.	...	.06¾	.06¾	.07¼	...	.07¼
Nickel Carbonate, bbls	lb.	.36	.37½	.36	.37½	.36	.37½
Chloride, bbls	lb.	.18	.20	.18	.20	.18	.20
Metal ingot	lb.	...	.35	...	.35	...	.35
Oxide, 100 lb kgs, NY	lb.	.35	.37	.35	.37	.35	.37
Salt, 400 lb bbls, NY	lb.	.13	.13½	.13	.13½	.13	.13½
Single, 400 lb bbls, NY	lb.	.13	.13½	.13	.13½	.13	.13½
Nicotine, 40%, drs, sulfate, 55 lb drs	lb.	...	.76	...	.76	...	.76
Nitre Cake, blk	ton	...	16.00	...	16.00	...	16.00
Nitrobenzene, redistilled, 1000 lb drs, wks	lb.	.08	.10	.08	.10	.08	.10
tks	lb.	...	.07½	...	.07½	...	.07½
Nitrocellulose, c-l, l-c-l, wks	lb.	.22	.29	.22	.29	.26	.29
Nitrogen Sol. 45½% ammon., f.o.b. Atlantic & Gulf ports, tks, unit ton		...	1.00	...	...	...	...
Nitrogenous Mat'l, bgs, imp unit		...	2.65	2.35	2.65	2.55	3.55
dom, Eastern wks	unit	...	2.60	2.50	2.75	2.50	4.25
dom, Western wks	unit	...	2.10	2.20	2.35	2.25	3.75
Nitronaphthalene, 550 lb bbls	lb.	.24	.25	.24	.25	.24	.25
Nutgalls Alleppo, bgs	lb.	no prices		...	...	.20	.22
Chinese, bgs	lb.	no prices		...	...	.20	.22
OAK BARK							
Oak Bark Extract, 25%, bbls	lb.	...	.03¼	...	.03¼	...	.03¼
tks	lb.	...	.02¾	...	.02¾	...	.02¾
Octyl Acetate, tks, wks	lb.	.16	.17	.16	.17	.16	.17

ρ Country is divided in 4 zones, prices varying by zone; ϕ Country is divided into 4 zones. Also see footnote directly above; q Naphthalene quoted on Pacific Coast F.A.S. Phila. or N. Y.

Current

Orange-Mineral Phenylhydrazine Hydrochloride

		Current Market	1938 Low	1938 High	1937 Low	1937 High
Orange-Mineral, 1100 lb cks NY	lb.	...	.10¼	.09½	.10¼	.10¼ .12¾
Orthoaminophenol, 50 lb kgs	lb.	2.15	2.25	2.15	2.25	2.15 2.25
Orthoanisidine, 100 lb drs	lb.	.70	.74	.70	.74	.70 .74
Orthochlorophenol, drs	lb.	.35	.75	.35	.75	.35 .75
Orthocresol, drs, wks	lb.	.13½	.14½	.13½	.14½	.13½ .14½
Orthodichlorobenzene, 1000 lb drs	lb.	.06	.07	.06	.07	.05 .07
Orthonitrochlorobenzene, 1200 lb drs, wks	lb.	.15	.18	15	.18	.28 .29
Orthonitroparachlorphenol, tins	lb.	...	.75	...	.75	.70 .75
Orthonitrophenol, 350 lb drs	lb.	.85	.90	.85	.90	.85 .90
Orthonitrotoluene, 1000 lb drs, wks	lb.	.08	.10	.08	.10	.07 .10
Orthotoluidine, 350 lb bbls, l-c-l	lb.	.16	.17	.16	.17	.14 .17
Osage Orange, cryst, bbls	lb.	.17	.25	.17	.25	.17 .25
51° liquid	lb.	.07	.08	.07	.08	.07 .08
Paraffin, rfd, 200 lb bgs 122-127° M P	lb.	.043	.0435	.043	.04½	.0445 .04½
128 132° M P	lb.	.0445	.0455	.0445	.049	.043¾ .049
133-137° M P	lb.	.05	.05¼	.05	.05¾	.05½ .05¾
Para aldehyde, 99%, tech, 110-55 gal drs, delv	lb.	...	.16	.16	.18	.16 .18
Aminoacetanilid, 100 lb kgs	lb.	...	.85	...	.85	... .85
Aminohydrochloride, 100 lb kgs	lb.	1.25	1.30	1.25	1.30	1.25 1.30
Aminophenol, 100 lb kgs	lb.	...	1.05	...	1.05	... 1.05
Chlorophenol, drs	lb.	.30	.45	.30	.45	.30 .45
Dichlorobenzene, 200 lb drs, wks	lb.	.11	.12	.11	.12	.11 .20
Formaldehyde, drs, wks	lb.	.34	.35	.34	.35	.34 .35
Nitroacetanilid, 300 lb bbls	lb.	.45	.52	.45	.52	.45 .52
Nitroaniline, 300 lb bbls, wks	lb.	.45	.47	.45	.47	.45 .47
Nitrochlorobenzene, 1200 lb drs, wks	lb.	.15	.16	.15	.16	.23½ .24
Nitro-orthotoluidine, 300 lb bbls	lb.	2.75	2.85	2.75	2.85	2.75 2.85
Nitrophenol, 185 lb bbls	lb.	.35	.37	.35	.37	.35 .37
Nitrosodimethylaniline, 120 lb bbls	lb.	.92	.94	.92	.94	.92 .94
Nitrotoluene, 350 lb bbls	lb.	...	.35	...	.35	... .35
Phenylenediamine, 350 lb bbls	lb.	1.25	1.30	1.25	1.30	1.25 1.30
Toluenesulfonamide, 175 lb bbls	lb.	.70	.75	.70	.75	.70 .75
tks, wks	lb.	...	.31	...	.31	... .31
Toluenesulfonchloride, 410 lb bbls, wks	lb.	.20	.22	.20	.22	.20 .22
Toluidine, 350 lb bbls, wks	lb.	.56	.58	.56	.58	.56 .58
Paris Green, dealers, drs	lb.	.23	.26	.23	.26½	.22 .26½
Pentane, normal, 28-38° C, group 3, tks	gal.	...	.08½	...	.08¼	.08½ .09½
drs, group 3	gal.	.11½	.16	.11½	.16	.12½ .16
Perchlorethylene, 100 lb drs, frt all'd	lb.	...	.10½	...	.10½	... .10½
Petrolatum, dark amber, bbls	lb.	.02⅝	.02¾	.02⅝	.03⅞	.02⅝ .03
Light, bbls	lb.	.03⅛	.03⅜	.03⅛	.03⅜	.03⅛ .03⅜
Medium, bbls	lb.	.02⅞	.03⅛	.02⅞	.03⅛	.02⅞ .03⅛
Dark green, bbls	lb.	.02½	.02¾	.02½	.02¾	.02½ .02¾
Red, bbls	lb.	.02½	.03⅜	.02½	.03⅜	.02⅛ .03¼
White, lily, bbls	lb.	.05¼	.07⅛	.05¼	.07⅛	.06 .06¼
White, snow, bbls	lb.	.06¼	.08⅛	.06¼	.08⅛	.07 .07¼
Petroleum Ether, 30-60°, group 3, tks	gal.	...	.13	...	.13	... .13
drs, group 3	gal.	.14	.17	.14	.17	.15 .17

PETROLEUM SOLVENTS AND DILUENTS

Cleaners naphthas, group 3, tks, wks	gal.	...	.06⅜	.06⅜	.07⅜	.06⅞	.07⅞
East Coast, tks, wks	gal.	...	.10	...	.10	.09½	10
Hydrogenated, naphthas, frt all'd East, tks	gal.	...	.16	...	.16	...	.16
No. 2, tks	gal.	...	.18	...	.18	...	.18
No. 3, tks	gal.	...	.16	...	.16	...	.16
No. 4, tks	gal.	...	.18	...	.18	...	.18
Lacquer diluents, tks, Bayonne	gal.	.12	.12½	.12	.12½	.12	.12½
Group 3, tks	gal.	...	.07⅜	.07⅜	.08⅜	.07⅞	.08⅞
Naphtha, V.M.P., East, tks, wks	gal.	...	.10	.10	.11	.10	.11
Group 3, tks, wks	gal.	...	.06⅜	.06⅜	.07⅜	.06⅞	.07⅞
Petroleum thinner, 43-47, East, tks, wks	gal.	...	.09½	...	.09½	.09	.10
Group 3, tks, wks	gal.	...	.05⅜	.05⅜	.06⅜	.05⅞	.06⅞
Rubber Solvents, stand grd, East, tks, wks	gal.	.09½	.10	.09½	.10	.09½	.10
Group 3, tks, wks	gal.	...	.06⅜	.06⅜	.07⅜	.06⅞	.07⅞
Stoddard Solvent, East, tks, wks	gal.	...	.10	.09½	.10	.09½	.10
Group 3, tks, wks	gal.	...	.05⅞	.05⅞	.06⅞	.06⅜	.07⅜
Phenol, 250-100 lb drs	lb.	.14½	.15½	.14½	.15½	.13¼	.15½
tks, wks	lb.	...	.13½	...	.13½	.12¾	.13½
Phenyl-Alpha-Naphthylamine, 100 lb kgs	lb.	...	1.35	...	1.35	...	1.35
Phenyl Chloride, drs	lb.	...	.17	...	.17	.16	.17
Phenylhydrazine Hydrochloride, com	lb.	...	1.50	...	1.50	...	1.50

Ready to Serve

at all times—in all places everything for refrigeration

BOWER BRAND AMMONIA

ANHYDROUS • AQUA
CALCIUM CHLORIDE
CORROSION RETARDER

Write for descriptive literature

Est. 1858

HENRY BOWER CHEMICAL MANUFACTURING COMPANY

29th & GRAY'S FERRY ROAD
PHILADELPHIA, PA.



EASTERN
Full Removable Head
CONTAINERS

Where added strength and security are needed use our "Bolted Ring Seal" drum shown above. Supplied in sizes from 10 to 70 gallons. Suitable for solids and semi-liquids. Consult us freely on your packaging problems.

We manufacture a complete line of light gauge containers.

EASTERN STEEL BARREL CORP.
BOUND BROOK - - - NEW JERSEY

SUNSHINE STATE POTASH
A PRODUCT OF NEW MEXICO U.S.A.
REG. U. S. PAT. OFF.

MURIATE OF POTASH
62/63% K_2O, ALSO 50% K_2O

MANURE SALTS
Approximately 30% K_2O

UNITED STATES
POTASH COMPANY
INCORPORATED
30 Rockefeller Plaza
New York, N. Y.

TECHNICAL
U.S.P.
RESORCIN
C. P.
CATECHOL
Resublimed Crystals
WRITE for PRICES
PENNSYLVANIA COAL PRODUCTS CO.
Est. 1916 PETROLIA, PA.

TARTARS
TARTARIC ACID
ROCHELLE SALT
CREAM TARTAR
Murray Hill 6-1990
441 LEXINGTON AVE NEW YORK
Wm. NEUBERG Inc.

Phloroglucinol
Rosin Oil

Prices

		Current Market		1938 High		1937 High	
Phloroglucinol, tech, tins	lb.	15.00	16.50	15.00	16.50	15.00	16.50
CP, tins	lb.	20.00	22.00	20.00	22.00	20.00	22.00
Phosphate Rock, f.o.b. mines							
Florida Pebble, 68% basis	ton	...	1.85	...	1.85	...	1.85
70% basis	ton	...	2.35	...	2.35	...	2.35
72% basis	ton	...	2.85	...	2.85	...	2.85
75-74% basis	ton	...	3.85	...	3.85	...	3.85
75% basis	ton	...	5.50	...	5.50	...	5.50
Tennessee, 72% basis	ton	...	4.50	...	4.50	...	4.50
Phosphorus Oxychloride 175 lb cyl	lb.	.16	.20	.16	.20	.16	.20
Red, 110 lb cases	lb.	.40	.44	.40	.44	.40	.44
Sesquisulfide, 100 lb cs.	lb.	.38	.44	.38	.44	.38	.44
Trichloride, cyl	lb.	.15	.18	.15	.18	.15	.20
Yellow, 110 lb cs, wks	lb.	.24	.30	.24	.30	.24	.33
Phthalic Anhydride, 100 lb drs, wks	lb.	...	.14½	...	.14½	.14½	.15½
Pine Oil, 55 gal drs or bbls							
Destructive dist	lb.	.52	.55	.52	.55	.49	.65
Steam dist wat wh	bbls	gal.	...	.59	...	.59	.59	.79
	tks	gal.		.54		.54	.54	.74
Pitch Hardwood, wks	ton	18.25	18.75	18.25	18.75	15.00	18.75
Coaltar, bbls, wks	ton	...	19.00	...	19.00	...	19.00
Burgundy, dom, bbls, wks	lb.	.05½	.06½	.05½	.06½	.03½	.06½
Imported	lb.	.15	.16	.15	.16	.11	.16
Petroleum, see Asphaltum in Gums' Section.							
Pine, bbls	bbl.	6.00	6.25	5.75	6.25	5.75	6.50
Stearin, drs	lb.	.03	.04½	.03	.04½	.03	.04½
Platinum, ref'd	oz.	33.00	36.00	32.00	38.00	32.00	68.00

POTASH

Potash, Caustic, wks, sol	lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
flake	lb.	.07	.07½	.07	.07½	.07	.07½
Liquid, tks	lb.	...	.02½	...	.02½	...	.02½
Manure Salts, imported 30% basis, blk	unit	...	.58½	...	.58½	.55	.58½
Potassium Abietate, bbls	lb.	...	.08	.08	.13	...	...
Acetate, tech, bbls, delv	lb.	...	.26	.26	.28	.26	.28
Bicarbonate, USP, 320 lb bbls	lb.	...	.18	...	.18	.09	.18
Bichromate Crystals, 725 lb cks*	lb.	.08¾	.09¼	.08¾	.09¼	.08¾	.09
Binoxalate, 300 lb bbls	lb.	...	.23	...	.23	...	.23
Bisulfate, 100 lb kgs	lb.	.15½	.18	.15½	.18	.15½	.18
Carbonate, 80-85% calc 800 lb cks	lb.	.06½	.07	.06½	.07	.06½	.07
liquid, tks	lb.	...	.02½	...	.02½	.02¼	.02½
drs, wks	lb.	.03	.03½	.03	.03½	.02½	.03½
Chlorate crys, 112 lb kgs, wks	lb.	.09¼	.09½	.09¼	.09½	.09¼	.09½
gran, kgs	lb.	.12	.13	.12	.13	.12	.13
powd, kgs	lb.	.08½	.08¾	.08½	.08¾	.08½	.08¾
Chloride, crys, bbls	lb.	.04	.04¾	.04	.04¾	.04	.04¾
Chromate, kgs	lb.	.19	.28	.19	.28	.28	.29
Cyanide, 110 lb cases	lb.	.50	.55	.50	.57½	.55	.57½
Iodide, 75 lb bbls	lb.	.93	1.00	.93	1.00	.93	1.15
Metabisulfite, 300 lb bbls	lb.	.12	.13½	.12	.15	.11	.15
Muriate, bgs, dom, blk	unit	...	.53½	...	.53½	.50	.53½
Oxalate, bbls	lb.	.25	.26	.25	.26	.25	.26
Perchlorate, kgs, wks	lb.	.09	.10½	.09	.11½	.09½	.11
Permanganate, USP, crys, 500 & 1000 lb drs, wks	lb.	.18½	.19½	.18½	.19½	.18½	.19½
Prussiate, red, bbls	lb.	.35	.37	.35	.37	.35	.37
Yellow, bbls	lb.	.15	.16	.15	.16	.15	.18
Sulfate, 90% basis, bgs	ton	...	38.00	...	38.00	...	36.25
Titanium Oxalate, 200 lb bbls	lb.	.35	.40	.35	.40	.33	.40
Pot & Mag Sulfate, 48% basis bgs	ton	...	25.75	...	25.75	24.75	25.75
Propane, group 3, tks	lb.	.03	.04½	.03	.04½	.03	.04½
Putty, coml, tubs	100 lb.	...	3.00	2.25	3.00	2.90	3.00
Linseed Oil, kgs	100 lb.	...	4.50	4.00	4.65	4.65	4.75
Pyrethrum, conc liq: 2.4% pyrethrins, drs, frt all'd	gal.	6.40	6.75	5.00	6.75	4.15	5.25
3.6% pyrethrins, drs, frt all'd	gal.	9.60	9.95	7.65	9.95	6.10	7.85
Flowers, coarse, Japan, bgs	lb.	...	.23¾	.18	.23¾	.12¾	.18
Fine powd, bbls	lb.	...	.25¼	.19	.25¼	.14	.19
Pyridine, denat, 50 gal drs	gal.	...	1.55	...	1.55	1.30	1.55
Refined, drs	lb.	...	.45	...	.45	...	...
Pyrites, Spanish cif Atlantic ports, blk	unit	.12	.13	.12	.13	.12	.13
Pyrocatechin, CP, drs, tins	lb.	2.15	2.75	2.15	2.75	2.15	2.75
Quebracho, 35% liq tks	lb.	...	.03	...	.03	.02½	.03
450 lb bbls, c-l	lb.	...	.03½	...	.03½	.03½	.03½
Solid, 63%, 100 lb bales cif	lb.	...	.04	...	.04	.03½	.04
Clarified, 64%, bales	lb.	...	.04¼	...	.04¼	.04¼	.04¼
Quercitron, 51 deg liq, 450 lb bbls	lb.	.06	.06½	.06	.06½	.06	.06½
Solid, drs	lb.	.10	.12	.10	.12	.10	.12

R SALT

R Salt, 250 lb bbls, wks	lb.	.52	.55	.52	.55	.52	.55
Resorcinol tech, cans	lb.	.75	.80	.75	.80	.75	.80
Rochelle Salt, cryst	lb.	.17¾	.18¼	.15	.18¼	.14½	.15½
Powd, bbls	lb.	.16¾	.17¼	.16	.18½	.13½	.16½
Rosin Oil, bbls, first run	gal.	.45	.47	.45	.60	.52	.73
Second run	gal.	.47	.49	.47	.62	.54	.75
Third run, drs	gal.	.51	.53	.51	.66	.58	.79

* Spot price is ½c higher.

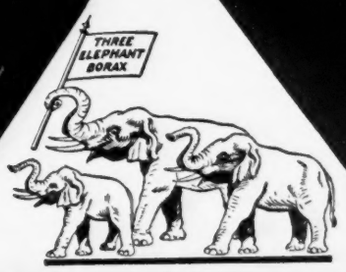
Current

Rosins
Sodium Naphthionate

		Current Market	1938 Low	1938 High	1937 Low	1937 High
Rosins 600 lb bbls, 280 lb unit ex. yard NY:†						
B		...	4.80	4.65	6.00	5.50	10.00
D		...	5.05	4.90	6.00	5.50	10.35
E		...	5.30	4.95	6.00	5.75	10.25
F		...	5.75	5.30	7.00	6.87½	10.80
G		...	6.05	5.50	7.05	6.87½	10.85
H		...	6.10	5.55	7.15	6.90	10.85
I		5.60	6.10	5.60	7.15	6.95	10.90
K		...	6.10	5.65	7.25	6.95	10.90
M		5.65	6.10	5.65	7.40	7.05	11.00
N		...	6.70	6.20	7.50	7.10	11.05
WG		...	7.20	6.80	8.45	7.65	11.75
WW		...	7.85	7.70	9.15	8.00	13.75
Rosins, Gum, Savannah (280 lb unit):†							
B		...	3.40	3.25	4.60	4.25	8.75
D		...	3.65	3.50	4.60	4.25	9.00
E		...	3.90	3.55	4.60	4.25	9.10
F		...	4.35	3.90	5.60	5.50	9.55
G		...	4.65	4.10	5.65	5.60	9.60
H		...	4.70	4.20	5.75	5.70	9.60
I		...	4.70	4.20	5.85	5.70	9.65
K		...	4.70	4.20	6.00	5.70	9.65
M		...	4.70	4.20	6.15	5.80	9.75
N		...	5.30	4.80	6.20	5.85	9.75
WG		...	5.80	5.40	7.05	6.40	10.50
WW		...	6.35	6.10	7.75	6.75	12.50
X		...	6.35	6.10	7.75	6.75	12.50
Rosin, Wood, c-l, FF grade, NY		...	5.05	5.05	6.40	6.40	10.72
Rotten Stone, bgs mines	ton	...	35.00	...	35.00	...	35.00
Imported, lump, bbls	lb.	...	.12	...	.12	...	...
Powdered, bbls	lb.	.08½	.10	.08½	.10	...	...
SAGO FLOUR							
Sago Flour, 150 lb bgs	lb.	.02½	.03½	.02½	.03¾	.02¾	.03¾
Sal Soda, bbls, wks	100 lb.	...	1.20	...	1.20	1.15	1.20
Salt Cake, 94-96%, c-l, wks	ton	19.00	23.00	19.00	23.00	19.00	23.00
Chrome, c-l, wks	ton	11.00	12.00	11.00	12.00	11.00	12.00
Saltpetre, gran, 450-500 lb bbls	lb.	.06½	.069	.06½	.069	.06	.069
Cryst, bbls	lb.	.07½	.0865	.07½	.0865	.07	.0865
Powd, bbls	lb.	.07½	.079	.07½	.079	.07	.079
Satin, White, pulp, 550 lb bbls	lb.	.01¼	.01½	.01¼	.01½	.01¼	.01½
Schaeffer's Salt, kgs	lb.	.46	.48	.46	.48	.46	.48
Shellac, Bone dry, bbls	lb. *r*	.18	.19	.16½	.19	.17	.22
Garnet, bgs	lb.	.13½	.14	.13½	.15	.14	.17
Superfine, bgs	lb. *s*	.11½	.12	.11½	.13½	.13	.18½
T. N., bgs	lb. *s*	.11	.11½	.11	.12½	.12	.14½
Silver Nitrate, vials	oz.	...	.31½	.31½	.34⅜	.32½	.35½
Slate Flour, bgs, wks	ton	9.00	10.00	9.00	10.00	9.00	10.00
Soda Ash, 58% dense, bgs, c-l, wks	100 lb.	...	1.10	...	1.10	...	1.10
58% light, bgs	100 lb.	...	1.08	...	1.08	...	1.08
blk	100 lb.	...	.90	...	.90	...	.90
paper bgs	100 lb.	...	1.05	...	1.05	...	1.05
bbls	100 lb.	...	1.35	...	1.35	...	1.35
Caustic, 76% grnd & flake, drs	100 lb.	...	2.70	...	2.70	...	2.70
76% solid, drs	100 lb.	...	2.30	...	2.30	...	2.30
Liquid sellers, tks	100 lb.	...	1.97½	...	1.97½	...	1.97½
Sodium Abietate, drs	lb.	...	.10	.10	.13	.08	.13
Acetate, 60% tech, gran, powd, flake, 450 lb bbls, wks	lb.	.04	.05	.04	.05	.04¼	.05
anhyd, drs, delv	lb.	...	.08¼	...	.08¼	...	...
Alignate, drs	lb.	...	.69	...	.69	.64	.69
Antimoniate, bbls	lb.	.12	.12½	.12	.15¼	.13¾	.16¼
Arsenate, drs	lb.	.08	.08½	.08	.08½	.08	.11½
Arsenite, liq, drs	gal.	.30	.33	.30	.33	.33	.40
Dry, gray, drs, wks	lb.	.07½	.09½	.07½	.09½	...	...
Benzoate, USP, kgs	lb.	.46	.48	.46	.48	.46	.48
Bicarb, powd, 400 lb bbl, wks	100 lb.	...	1.85	...	1.85	1.75	1.85
Bichromate, 500 lb cks, wks*	lb.	.06¾	.07¼	.06¾	.07¼	.06½	.07¼
Bisulfite, 500 lb bbl, wks	lb.	.03¼	.036	.03¼	.036	.03¼	.036
35-40% sol bbls, wks	100 lb.	1.40	1.80	1.40	1.80	...	...
Chlorate, bgs, wks	lb.	.06¼	.07½	.06¼	.07½	.06¼	.07½
Cyanide, 96-98%, 100 & 250 lb drs, wks	lb.	.14	.15	.14	.17½	.15½	.17½
Diacetate, 33-35% acid, bbls, lcl, delv	lb.	...	.09	...	.09	...	...
Fluoride, white 90%, 300 lb bbls, wks	lb.	.07½	.08¼	.07½	.08¼	.07½	.08¼
Hydrosulfite, 200 lb bbls, f.o.b. wks	lb.	.16	.17	.16	.17	.16	.17
Hyposulfite, tech, pea crys 375 lb bbls, wks	100 lb.	...	2.80	2.50	2.80	2.50	3.00
Tech, reg cryst, 375 lb bbls, wks	100 lb.	2.45	2.80	2.40	2.80	2.40	2.75
Iodide	lb.	1.90	1.95	1.90	1.95	1.90	1.95
Metal, drs, 280 lbs.	lb.	...	.19	...	.19	...	.19
Metanilate, 150 lb bbls	lb.	.41	.42	.41	.42	.41	.42
Metasilicate, gran, c-l, wks	100 lb.	...	2.20	2.15	2.20	...	2.15
cryst, bbls, c-l, wks	100 lb.	...	2.90	2.75	2.90	...	2.75
Monohydrate, bbls	lb.	...	.023	...	.023	...	.023
Naphthenate, drs	lb.	.12	.19	.12	.19	.09	.19
Naphthionate, 300 lb bbl	lb.	.52	.54	.52	.54	.52	.54

r Bone dry prices at Chicago 1c higher; Boston ½c; Pacific Coast 2c; Philadelphia deliveries f.o.b. N. Y.; refined 6c higher in each case; *s* T. N. and Superfine prices quoted f.o.b. N. Y. and Boston; Chicago prices 1c higher; Pacific Coast 3c; Philadelphia f.o.b. N. Y. * Spot price is ½c higher; † Closing prices Nov. 26th.

Specify



THREE ELEPHANT
BORAX-BORIC ACID

POTASH TRONA SALTS
MURIATE OF POTASH
Stocks carried in principal cities of United States and Canada

AMERICAN POTASH & CHEMICAL CORP.
70 PINE STREET NEW YORK

Acetamide
Uses: Soldering Pastes and Fluxes - Cellulose Acetate Plasticizer - Organic Solvent - Anti-Acid for Lacquers - Solubilizing Agent.
SEBACIC ACID
CAPRYL ALCOHOL
GLYCOCOLL
AMECCO CHEMICALS, INC.
(Formerly American Chemical Products Co.)
75 Rockwood St. Rochester, N. Y.
AMECCO CHEMICALS

BAGPAK INC
- A Complete Packaging Service
- Multiwall Paper Shipping Sacks for all Purposes
- Packaging and Bag Closing Equipment

BAGPAK, INC. 220 East 42nd Street New York City

SULPHUR

CRUDE 99½% PURE

Free from arsenic, selenium and tellurium

WE . . .

respectfully solicit your inquiries . . .

●

MINES—Clemens, Brazoria County, Texas.

For convenience of Buyers, we are now carrying stocks at Baltimore.

JEFFERSON LAKE OIL CO., INC.

SUITE 1406-9, WHITNEY BLDG., NEW ORLEANS, LA.

Sodium Sulphide (Na_2S)

Solid, Strips, Liquid in Tank Cars

BARIUM REDUCTION CORP.

SOUTH CHARLESTON, W. VA.

SODIUM BENZOATE USP
BENZOIC ACID USP

FREE FROM FOREIGN ODOR AND TASTE.

SHIPPED IN 100-POUND PAPER-LINED BARRELS.

HOOKER ELECTROCHEMICAL COMPANY

60 EAST 42ND STREET NEW YORK

1080

Prices

	Current Market	1938 Low	1938 High	1937 Low	1937 High
Sodium (continued):					
Nitrate, 92%, crude, 200 lb bgs, c-l, NY ton	...	28.30	...	28.30	26.80	28.30
100 lb bgs ton	...	29.00	...	29.00	27.50	29.00
Bulk ton	...	27.00	...	27.00	25.50	27.00
Nitrite, 500 lb bbls lb.	.06¾	.11½	.06¾	.11½	.07	.10
Orthochlorotoluene, sulfonate, 175 lb bbls, wks lb.	.25	.27	.25	.27	.25	.27
Perborate, drs, 400 lbs lb.	.14¾	.15¼	.14¾	.15¼	.14¾	.15¼
Peroxide, bbls, 400 lb lb.	...	.17	...	.17	...	.17
Phosphate, di-sodium, tech, 310 lb bbls, wks 100 lb.	...	2.05	...	2.05	1.90	2.05
bgs, wks 100 lb.	...	1.85	...	1.85	1.70	1.85
Tri-sodium, tech, 325 lb bbls, wks 100 lb.	...	2.20	...	2.20	2.05	2.20
bgs, wks 100 lb.	...	2.00	...	2.00	1.85	2.00
Picramate, 160 lb kgs lb.	.65	.67	.65	.67	.65	.67
Prussiate, Yellow, 350 lb bbl. wks lb.	.10	.11½	.10	.11½	.10	.11½
Pyrophosphate, anhyd, 100 lb bbls lb.	...	.10	...	.10	...	.10
Sesquisilicate, drs, c-l, wks 100 lb.	...	3.00	...	3.00	...	...
Silicate, 60°, 55 gal drs, wks 100 lb.	1.65	1.70	1.65	1.70	1.65	1.70
40°, 35 gal drs, wks 100 lb.	...	.80	...	.80	...	.80
tks, wks 100 lb.	...	.65	...	.65	...	.65
Silicofluoride, 450 lb bbls NY lb.	.05¾	.06	.05¾	.06½	.05¾	.07
Stannate, 100 lb drs lb.	.28½	.31½	.25½	.32	28	.44
Stearate, bbls lb.	...	.24	...	.24	.19	.24
Sulfanilate, 400 lb bbls lb.	.16	.18	.16	.18	.16	.18
Sulfate Anhyd, 550 lb bgs* c-l, wks 100 lb. †	1.45	1.90	1.45	1.90	1.45	1.90
Sulfide, 80% cryst, 440 lb bbls, wks lb.	...	.02¼	...	.02¼	...	.02¼
Solid, 650 lb drs, c-l, wks lb.	...	.03	...	.03	...	.02
Sulfite, cryst, 400 lb bbls, wks lb.	.023	.02½	.023	.02½	.023	.02½
Sulfocyanide, drs lb.	.28	.47	.28	.47	.28	.47
Sulforicinoleate, bbls lb.	...	.12	...	.12	...	.12
Tungstate, tech, crys, kgs lb.	...	nom.	...	...	.85	.90
Sorbitol, com, solut., wks, c-l drs, wks lb.	...	.17	.17	.19	...	.25
Spruce Extract, ord, tks lb.	...	.01⅛	...	.01⅛	.01	.01⅛
Ordinary, bbls lb.	...	.01⅝	...	.01⅝	.01½	.01⅝
Super spruce ext, tks lb.	...	.01⅜	...	.01⅜	.01⅜	.01⅝
Super spruce ext, bbls lb.	...	.01⅞	...	.01⅞	...	.01⅞
Super spruce ext, powd, bgs lb.	...	.04	...	.04	.04	.04¼
Starch, Pearl, 140 lb bgs 100 lb.	2.60	2.80	2.60	3.18	2.93	4.53
Powd, 140 lb bgs 100 lb.	2.70	2.95	2.70	3.28	3.03	4.63
Potato, 200 lb bgs lb.	.04	.05	.03½	.05½	.04½	.05½
Imp, bgs lb.	.05	.06	.05	.06	.05	.06
Rice, 200 lb bbls lb.	.06¼	.07¼	.06¼	.07¼	...	.07¼
Wheat, thick, bgs lb.	.06¼	nom.	.06¼	.07	.07	.08½
Strontium carbonate, 600 lb bbls, wks lb.	.07¼	.07½	.07¼	.07½	.07¼	.07½
Nitrate, 600 lb bbls, NY lb.	.08¼	.09¼	.07¾	.09¼	.07¾	.08¾
Sucrose octa-acetate, den, grd, bbls, wks lb.	...	.45	...	.45	...	.45
tech, bbls, wks lb.	...	.40	...	.40	...	.40
Sulfur, crude, f.o.b. mines ton	18.00	19.00	18.00	19.00	18.00	19.00
Flour, coml, bgs 100 lb.	1.65	2.35	1.65	2.35	1.65	2.35
bbls 100 lb.	1.95	2.70	1.95	2.70	1.95	2.70
Rubbermakers, bgs 100 lb.	2.20	2.80	2.20	2.80	2.20	2.80
bbls 100 lb.	2.55	3.15	2.55	3.15	2.55	3.15
Extra fine, bgs 100 lb.	2.85	3.00	2.85	3.00	2.85	3.00
Superfine, bgs 100 lb.	2.65	2.80	2.65	2.80	2.65	2.80
bbls 100 lb.	2.25	3.10	2.25	3.10	2.25	3.10
Flowers, bgs 100 lb.	3.00	3.75	3.00	3.75	3.00	3.75
bbls 100 lb.	3.35	4.10	3.35	4.10	3.35	4.10
Roll, bgs 100 lb.	2.35	3.10	2.35	3.10	2.35	3.10
bbls 100 lb.	2.50	3.25	2.50	3.25	2.50	3.25
Sulfur Chloride, 700 lb drs, wks lb.	.03	.04	.03	.04	.02½	.04
Sulfur Dioxide, 150 lb cyl lb.	.07	.09	.07	.09	.07	.09
Multiple units, wks lb.	.04½	.07	.04½	.07	.04½	.07
tks, wks lb.	.04	.05	.04	.05	.04	.05
Refrigeration, cyl, wks lb.	.16	.17	.16	.17	.15	.17
Multiple units, wks lb.	.07½	.10	.07½	.10	.07½	.10
Sulfuryl Chloride lb.	.15	.40	.15	.40	.15	.40
Sumac, Italian, grd ton	...	63.00	62.00	66.00	58.50	65.00
Extract, 42°, bbls lb.	.05¼	.06¼	.05¼	.06¼	.05¼	.06¼
Superphosphate, 16% bulk, wks ton	...	8.00	8.00	9.00	8.25	9.00
Run of pile ton	...	7.50	7.50	8.50	8.00	8.50
Triple, 44-45%, a. p. a. bulk, wks, Balt. unit ton	...	.85	...	.85	.70	.85
Talc, Crude, 100 lb bgs, NY ton	13.00	15.00	13.00	15.00	13.00	15.00
Ref'd, 100 lb bgs, NY ton	14.00	16.00	14.00	16.00	14.00	16.00
French, 220 lb bgs, NY ton	23.00	30.00	23.00	30.00	23.00	30.00
Ref'd, white, bgs, NY ton	45.00	60.00	45.00	60.00	45.00	60.00
Italian, 220 lb bgs to arr ton	60.00	62.00	60.00	62.00	60.00	62.00
Ref'd, white, bgs, NY ton	65.00	70.00	65.00	70.00	65.00	70.00
Tankage Grd, NY unit ‡	...	2.60	2.50	3.00	3.00	4.40
Ungrd unit ‡	...	2.50	2.35	2.90	2.80	4.35
Fert grade, f.o.b. Chgo unit ‡	...	2.40	2.25	2.75	2.75	4.00
South American cif unit ‡	...	3.00	3.00	3.45	3.15	4.25
Tapioca Flour, high grade, bgs lb.	.02	.05½	.02	.05½	.03¼	.05½
Tar Acid Oil, 15%, drs gal.	.22	.25	.22	.25½	.21	.25½
25%, drs gal.	.25½	.28½	.25½	.29½	.24½	.29½
Tar, pine, delv, drs gal.	...	.26	...	.26	...	.26
tks, delv, E. cities gal.	...	.20	...	.20	...	.20
Tartar Emetic, tech, bbls lb.	.27¾	.28	.26¾	.28	.24¾	.27
USP, bbls lb.	.33	.33½	.32	.33½	.30	.32½

† Bags 15c lower; ‡ + 10; *Bbls. are 20c higher.

Current

		Current Market	1938 Low	1938 High	1937 Low	1937 High
Terpineol, den grade, drs	lb.	...	.17	...	.17	.13¾	.14¾
Tetrachlorethane, 650 lb drs	lb.	.08	.08½	.08	.08½	.08	.08½
Tetrachloroethylene, drs, tech	lb.	...	.09½	...	.09½	...	.10½
Tetralene, 50 gal drs, wks	lb.	.12	.13	.12	.13	.12	.13
Thiocarbanilid, 170 lb bbls	lb.	.20	.25	.20	.25	.20	.25
Tin, crystals, 500 lb bbls, wks	lb.	.34½	.35	.31	.35	.33	.46
Metal, NY	lb.	...	.4290	.3570	.4295	.41	.66
Oxide, 300 lb bbls, wks	lb.	.46	.48	.44	.50	.48	.62
Tetrachloride, 100 lb drs, wks	lb.	...	.21¾	.18½	.21¾	.21	.32
Titanium Dioxide, 300 lb bbls	lb.	.15¼	.16	.15¼	.17	.16¼	.17
Barium Pigment, bbls	lb.	.05⅝	.05⅞	.05⅝	.06⅜	.06	.06⅜
Calcium Pigment, bbls	lb.	.05⅝	.05⅞	.05⅝	.06⅜	.06	.06⅜
Toluidine, mixed, 900 lb drs, wks	lb.	.26	.27	.26	.27	.26	.27
Toluol, 110 gal drs, wks	gal.	...	.27	.27	.35	...	.35
8000 gal tks, frt all'd	gal.	...	.22	.22	.30	...	.30
Toner Lithol, red, bbls	lb.	.75	.80	.75	.80	.75	.80
Para, red, bbls	lb.	.75	.80	.75	.80	...	.75
Toluidine, bgs	lb.	...	1.35	...	1.35	...	1.35
Triacetin, 50 gal drs, wks	lb.	...	.36	...	.36	...	.36
Triamyl Borate, lcl, drs, wks	lb.	...	.27	...	.27	...	.27
Triamylamine, c-l, drs, wks	lb.	.77	1.25	.77	1.25	.77	1.25
Tributylamine, lcl, drs, wks	lb.	...	.70	...	.70	...	...
Tributyl citrate, drs, frt all'd	lb.	...	.45	...	.45	...	.45
Tributyl Phosphate, frt all'd	lb.	...	.50	...	.50	...	.50
Trichlorethylene, 600 lb drs, frt all'd E. Rocky Mts	lb.	.089	.094	.089	.094	.089	.094
Tricresyl phosphate, tech, drs	lb.	.24½	.39	.24½	.39	.22½	.26½
Triethanolamine, 50 gal drs wks	lb.	.21	.22	.21	.22	.21	.30
tks, wks	lb.	...	.20	...	.20	.20	.25
Triethylene glycol, drs, wks	lb.	...	.26	...	.26	...	...
Trihydroxyethylamine Oleate, bbls	lb.	...	.30	...	.30	...	...
Stearate, bbls	lb.	...	.30	...	.30	...	...
Trimethylamine, c-l, drs, frt all'd E. Mississippi	lb.	...	1.00	...	1.00	...	1.00
Triphenylguanidine	lb.	.58	.60	.58	.60	.58	.60
Triphenyl Phosphate, drs	lb.	...	.38	.34	.38	...	...
Tripoli, airfloated, bgs, wks	ton	26.00	30.00	26.00	30.00	25.00	30.00
Turpentine (Spirits), c-l, NY dock, bbls	gal.	...	.29½	.27½	.31½	.31	.47
Savannah, bbls	gal.	...	.23½	.22¼	.30¾	.25	.42
Jacksonville, bbls	gal.	...	.23¾	.22½	.30¾	.25	.41
Wood Steam dist, bbls, c-l, NY	gal.	...	.27	.27	.31	.30	.44
Wood, dest dist, c-l, drs, delv E. cities	gal.	...	.36	.33	.36	...	...
Urea, pure, 112 lb cases	lb.	.14½	.15½	.14½	.15½	.14½	.15½
Fert grade, bgs, c.i.f.	ton	...	...	...	...	...	...
c.i.f. S.A. points	ton	95.00	110.00	95.00	110.00	95.00	110.00
Dom, f.o.b., wks	ton	95.00	101.00	95.00	101.00	95.00	101.00
Urea Ammonia liq 55% NH_3, tks	unit	...	1.00	1.00	1.04	1.00	1.04
Valonia beard, 42%, tannin bgs	ton	...	47.00	47.00	52.00	35.00	52.00
Cups, 32% tannin, bgs	ton	32.00	34.00	33.00	37.50	31.50	36.00
Extract, powd, 63%	lb.	...	.06	...	.06	...	...
Vanillin, ex eugenol, 25 lb tins, 2000 lb lots	lb.	...	2.35	2.35	3.10	3.10	3.65
Ex-guaiacol	lb.	...	2.25	2.25	3.00	3.00	3.55
Vermilion, English, kgs	lb.	1.55	1.69	1.45	1.69	1.60	1.90
Wattle Bark, bgs	ton	39.75	41.75	39.75	41.75	31.00	43.75
Extract, 60°, tks, bbls	lb.	...	.04⅜	.04⅜	.04⅝	.03⅝	.04⅝
WAXES							
Wax, Bayberry, bgs	lb.	.16⅞	.17	.16⅞	.17	.16½	.17½
Bees, bleached, white 500 lb slabs, cases	lb.	.37	.39	.35	.45	.38	.45
Yellow, African, bgs	lb.	.22	.25½	.22	.26	.25	.30
Brazilian, bgs	lb.	.23	.25	.23	.29	.27	.34
Chilean, bgs	lb.	.23	.25	.23	.29	.27	.34
Refined, 500 lb slabs, cases	lb.	.33	.33½	.32	.39	.29½	.39
Candelilla, bgs	lb.	.14½	.15½	.13½	.15½	.13	.16½
Carnauba, No. 1, yellow, bgs	lb.	.40½	.41	.38	.44	.42	.49
No. 2, yellow, bgs	lb.	.39½	.40	.36	.42	.41	.46½
No. 2, N. C., bgs	lb.	.36½	.37	.35½	.40	.38	.43
No. 3, Chalky, bgs	lb.	.34	.34¾	.31½	.35	.33	.40
No. 3, N. C., bgs	lb.	.33½	.34	.31½	.35½	.34	.43
Ceresin, dom, bgs	lb.	.08½	.11½	.08½	.11½	.08	.12
Japan, 224 lb cases	lb.	.10	.10¼	.09½	.10½	.09½	.11¼
Montan, crude, bgs	lb.	.11	.12	.11	.12	.11	.12
Paraffin, see Paraffin Wax.							
Spermaceti, blocks, cases	lb.	.23	.24	.23	.24	.23	.24
Cakes, cases	lb.	.24	.25	.24	.25	.24	.25
Whiting, chalk, com, 200 lb bgs c-l, wks	ton	12.00	14.00	12.00	14.00	12.00	14.00
Gilders, bgs, c-l, wks	ton	...	15.00	...	15.00	...	15.00
Wood Flour, c-l, bgs	ton	20.00	33.00	20.00	33.00	18.00	30.00
Xylol, frt allowed, East 10° tks, wks	gal.	...	.29	.29	.33	...	.33
Coml, tks, wks, frt all'd	gal.	...	.26	.26	.30	...	.30
Xylidine, mixed crude, drs	lb.	.35	.36	.35	.36	.35	.36
Zinc Acetate, tech, bbls, lcl, delv	lb.	...	.21	...	.21	...	...
Arsenate, bgs, frt all'd	lb.	.12½	.13	.12½	.13½	...	...
Arsenite, bgs, frt all'd	lb.	.12½	.13	.12½	.13	...	...
Carbonate tech, bbls, NY	lb.	.14	.15	.14	.15	.12	.15
Chloride fused, 600 lb drs, wks	lb.	.04½	.046	.04½	.046	.04½	.046
Gran, 500 lb drs, wks	lb.	.05	.05¼	.05	.05¼	.05	.05¼
Soln 50%, tks, wks 100	lb.	...	2.25	...	2.25	2.00	2.25
Cyanide, 100 lb drs	lb.	...	.33	.33	.38	.36	.38
Dust, 500 lb bbls, c-l, delv	lb.	...	.06¾	.06	.0740	.0740	.094
Metal, high grade slabs, c-l, NY	100 lb.	...	4.89	4.35	5.35	5.35	7.85
E. St. Louis	100 lb.	...	4.50	4.00	5.00	5.00	7.50

Make sure you will have each article in the series for your PERSONAL use

Creating Industries: 1918-38

No busy man connected with industry—whether in producing or in using chemicals—should deprive himself of this opportunity to be informed on the dollars-and-cents significance of chemical advance in all industrial fields.

The fifty articles comprising this series will bring you up to date on the ramifications of chemical progress since the World War.

The articles in this issue will prove to you how invaluable you will find this series in your work. Subscribe now and you will be sure of your copy each month.

SOME OF THE FIFTY AUTHORS

Dr. Frederick M. Becket	George W. Johnson
Dr. Horace W. Gillett	Dr. Joseph Harold
John Weiss	Stanley B. Hunt
Dr. E. C. Williams	A. E. Marshall
Dr. Benjamin T. Brooks	Dr. William C. Geer
Robert T. Baldwin	Charles H. MacDowell
Prof. Alexander Lowy	Dr. R. C. Roark
Frank G. Breyer	L. H. Enslow
Dr. George Barsky	Dr. Wilhelm Hirschkind
Dr. L. C. Jones	John Marshall
Dr. Gustavus J. Esselen	Dr. Albert E. Gessler
Dr. Julian K. Dale	Allen Abrams
John D. Rue	A. E. Weith
Dr. Poole Maynard	Dr. John A. Wilson
Dr. Elvin H. Killheffer	Dr. Edwin W. Tillotson
Dr. Eric Kunz	Crosby Field
Dr. Herbert T. Kalmus	A. Cressy Morrison
Dr. George D. Beale	Louis A. deBlois
Dr. Joseph Rosin	T. P. Callahan
Frank J. Tone	Harry M. Mabey
Dr. Jerome Alexander	D. P. Morgan

CHEMICAL INDUSTRIES
149 Temple Street, New Haven, Conn.

Enter my order for a year's subscription to CHEMICAL INDUSTRIES. Domestic, $3; Foreign, $4.

☐ Enclosed find check ☐ Render Invoice

Name _____

Company _____

Address _____

_____

YELKIN "T"

THE STANDARDIZED LECITHIN

A NATURAL FAT SOLUBLE

WETTING AGENT

VISCOSITY-STABILIZER

ANTI-OXIDANT

Yelkin "T" is soluble in all vegetable and animal fats, waxes, petroleum oil and distillates. It swells in water and forms a colloidal solution.

Now available in standardized grades for technical use on a commercial price basis.

Grade "T"—Dark Brown
Grade "S"—Light Brown
Grade "D"—Golden

SCIENTIFICALLY CONFIRMED AND COMMERCIALLY ACCEPTED

Samples for experiments furnished without charge if requested on your business stationery.

ROSS & ROWE, INC.

SPECIALIZING IN COLLOIDAL PRODUCTS

75 VARICK STREET NEW YORK

WRIGLEY BLDG. CHICAGO

A FULL LINE OF SILICATES OF SODA

SILICATE HEADQUARTERS

YOU can be sure of the right grade from P.Q.'s line of 33 silicates of soda. If you use silicate of soda or suspect that you can, come to...

PHILADELPHIA QUARTZ COMPANY

General Offices and Laboratory: 125 S. Third St., Philadelphia, Penna.
Chicago Sales Office: 205 W. Wacker Drive. Stocks in 60 cities
Works: Anderson, Ind., Baltimore, Md., Chester, Pa., Buffalo, N.Y., Kansas City, Kans., Rahway, N. J., St. Louis, Mo., Utica, Ill.

PQ

CRUDE SULPHUR

99½% PURE

Free From
ARSENIC, SELENIUM AND TELLURIUM

TEXAS GULF SULPHUR COMPANY
(INCORPORATED)
75 East 45th St., New York City
Deposits and Plants: Newgulf and Long Point, Texas

Prices—Current

Zinc Oxide
Oil, Whale

		Current Market		1938 Low	1938 High	1937 Low	1937 High
Zinc (continued):							
Oxide, Amer, bgs, wks	lb.	.06¼	.07½	.06	.07½	.05¼	.07¾
French 300 lb bbls, wks	lb.	.06¼	.07¾	.06¼	.07¾	.05½	.07¾
Palmitate, bbls	lb.	.23	.25	.23	.25	.23	.25
Resinate, fused, pale, bbls	lb.	...	.10	...	.10	.09	.10
Stearate, 50 lb bbls	lb.	.20	.23	.20	.23	.20	.23
Zinc Sulfate, crys, 400 lb bbl, wks	lb.	...	.029	.029	.033	.028	.033
Flake, bbls	lb.	...	.0325	.0325	.0375	.032	.0375
Sulfide, 500 lb bbls, delv	lb.	.08⅜	.08⅝	.08⅜	.09¾	.09¼	.09¾
bgs, delv	lb.	.09	.09½	.09	.09½	.09	.09½
Sulfocarbolate, 100 lb kgs	lb.	.24	.26	.24	.26	.24	.26
Zirconium Oxide, crude, 73-75% grd, bbls, wks	ton	75.00	100.00	75.00	100.00	...	...
kgs, wks	lb.	.04¼	.04½	.04¼	.04½	...	...

Oils and Fats

Babassu, tks, futures	lb.	...	.06⅜	.06¼	.06¾	.06¾	.11¼
Castor, No. 3, 400 lb bbls	lb.	.09¼	.10	.09¼	.10¼	.10¼	.10¾
Blown, 400 lb bbls	lb.	.11¼	.12	.11¼	.13	.12¼	.13
China Wood, drs, spot NY	lb.	.12⅛	.12¼	.10¼	.15¼	.12½	.23
Tks, spot NY	lb.	.11½	.11¾	.095	.15½	.118	.23
Coconut, edible, bbls NY	lb.	...	.09	.09	.09½	.09½	.15
Manila, tks, NY	lb.	...	.03⅜	.03¼	.04¼	.04	.09½
Tks, Pacific Coast	lb.	...	.03	.03	.03¾	.03¾	.08⅞
Cod, Newfoundland, 50 gal bbls	gal.	.50	nom.	.50	.52	.51	.52
Copra, bgs, NY	lb.	...	.0190	.0185	.0235	.0235	.055
Corn, crude, tks, mills	lb.	.07¼	.07⅜	.06⅝	.07¾	.06½	.10¾
Refd, 375 lb bbls, NY	lb.	.09⅜	.09⅝	.09¼	.10¼	.09	.13¼
Degras, American, 50 gal bbls, NY	lb.	.07¾	.08¼	.07½	.08¼	.07½	.08¼
English, bbls, NY	lb.	.07¾	.08¼	.07½	.08¼	.07½	.08¼
Greases, Yellow	lb.	.04¾	.04⅞	.03½	.05½	.04¼	.09
White, choice bbls, NY	lb.	.05¾	.05⅞	.05	.07	.06¾	.10¼
Lard Oil, edible, prime	lb.	...	.11¼	.11⅛	.12¾	.12¾	.16¾
Extra, bbls	lb.	...	.09¼	.09⅛	.10¾	.10¾	.13½
Extra, No. 1, bbls	lb.	...	.09	.08⅞	.09¾	.09¼	.13½
Linseed, Raw less than 5 bbl lots	lb.	.094	.096	.094	.115	.107	.121
bbls, c-l, spot	lb.	.086	.088	.086	.102	.099	.113
Tks	lb.	...	.084	.084	.096	.093	.107
Menhaden, tks, Baltimore	gal.	.27	nom.	.34½	.37½	.34	.45
Refined, alkali, drs	lb.	.07½	.077	.07½	.095	.08	.10
Tks	lb.	...	.069	.069	.087	.074	.09
Kettle bodied, drs	lb.	.084	.086	.084	.105	.09	.11
Light pressed, drs	lb.	.069	.0710	.069	.091	.074	.094
Tks	lb.	...	.063	.063	.08	.067	.084
Neatsfoot, CT, 20°, bbls, NY	lb.	...	.15¼	.15¼	.17¼	.16¾	.18¼
Extra, bbls, NY	lb.	...	.09¼	.09⅛	.10	.09½	.13¾
Pure, bbls, NY	lb.	...	.11¾	.11¾	.12¼	.11¾	.14¼
Oiticica, bbls	lb.	.10	.10¼	.09¼	.12¾	.10⅞	.17
Oleo, No. 1, bbls, NY	lb.	...	.09	.08½	.10½	.10½	.14½
No. 2, bbls, NY	lb.	...	.08½	.08	.10	.10	.14
Olive, denat, bbls, NY	gal.	.88	.92	.88	1.20	1.15	1.65
Edible, bbls, NY	gal.	1.75	2.00	1.75	2.35	2.20	2.50
Foots, bbls, NY	lb.	.07⅞	.08	.07⅞	.09⅞	.09⅝	.12½
Palm, Kernel, bulk	lb.	...	.04⅛	.04⅛	.04½	.04½	.08⅛
Niger, cks	lb.	.04	.04¼	.032	.04½	.04	.07¼
Sumatra, tks	lb.	...	.03	.03	.0375	.0375	.06½
Peanut, crude, bbls, NY	lb.	.07½	.07¾	.07	.07¾	.06¼	.10⅝
Tks, f.o.b. mill	lb.	...	.07¼	.06⅝	.07½	.06½	.10¼
Refined, bbls, NY	lb.	.10	.10¼	.09¾	.10¼	.10	.13½
Perilla, drs, NY	lb.	.10¼	.10½	.10	.11¾	.11	.13½
Tks, Coast	lb.	.096	.098	.096	.11	.105	.13
Pine, see Pine Oil, Chemical Section.							
Rapeseed, blown, bbls, NY	lb.	.14½	.14¾	.14½	.14¾	.13	.14¾
Denatured, drs, NY	gal.	.75	.80	.75	.91	.85	.97
Red, Distilled, bbls	lb.	...	.08⅜	.08⅜	.10⅝	.09⅝	.12⅝
Tks	lb.	...	.07½	.07½	.09¾	.08¾	.10¾
Sardine, Pac Coast, tks	gal.	...	.36	.36	.46½	.35	.55
Refined alkali, drs	lb.	.07½	.077	.07½	.095	.08	.10
Tks	lb.	...	.069	.069	.087	.074	.09
Light pressed, drs	lb.	.069	.077	.069	.089	.074	.094
Tks	lb.	...	.063	.063	.08	.067	.084
Sesame, yellow, dom	lb.	.10¼	.10½	.10¼	.10½	.10¼	.13¼
White, dom	lb.	.10¼	.10½	.10¼	.10½	.10¼	.13¼
Soy Bean, crude							
Dom, tks, f.o.b. mills	lb.	.06	.06½	.06	.07	.06	.10½
Crude, drs, NY	lb.	.068	.07½	.066	.08	.066	.11½
Ref'd, drs, NY	lb.	.078	.092	.078	.097	.078	.12½
Tks	lb.	.072	.077	.072	.082	.072	.11½
Sperm, 38° CT, bleached, bbls NY	lb.	.10	.102	.10	.102	.096	.102
45° CT, bleached, bbls, NY	lb.	.093	.095	.093	.095	.089	.095
Stearic Acid, double pressed dist bgs	lb.	.11	.12	.11	.12	.11	.13½
Double pressed saponified bgs	lb.	.11¼	.12¼	.11¼	.12¼	.11¼	.13¾
Triple pressed dist bgs	lb.	.14	.15	.14	.15	.14	.16½
Stearine, Oleo, bbls	lb.	.06½	.06¾	.05½	.08	.07	.11½
Tallow City, extra loose	lb.	...	.05⅜	.04¾	.06⅜	.05⅞	.09¼
Edible, tierces	lb.	...	.06¾	.06	.07¼	.06⅞	.10¼
Acidless, tks, NY	lb.	...	.08¼	.08	.09¼	.09	.13
Turkey Red, single, bbls	lb.	.06¼	.08½	.06¼	.08½	.08	.08½
Double, bbls	lb.	.09½	.11	.09½	.13	.12½	.13
Whale:							
Winter bleach, bbls, NY	lb.	.089	.091	.089	.10	.091	.111
Refined, nat. bbls, NY	lb	.085	.087	.085	.096	.087	.107

Index to Advertisers

Mallinckrodt Chemical Works 64
Mann & Co., Inc., Geo. 100
Mathieson Alkali Works, Inc. 3
Monsanto Chemical Co. 33
Morgan, Inc., Clarence 100
Mutual Chemical Co. of America, Inc. 5

National Carbon Co., Inc. 43
Natural Products Refining Co. 10
Neuberg, Inc., William 92
Niacet Chemicals Corp. 81

Oldbury Electro-Chemical Co. 87

Pacific Coast Borax Co. 87
Paramet Chemical Corp. 89
Penick & Co., S. B. 34
Pennsylvania Coal Products Co. 92
Petrometer Corp. 101
Pfaltz & Bauer, Inc. 99
Pfizer, Chas. & Co., Inc. 72
Philadelphia Quartz Co. 96
Polachek, Z. H. 101
Prior Chemical Corp. 58

Ross & Rowe, Inc. 96

Schwabacher & Co., Inc., S. 90
Sharples Solvents Corp. 61
Sobin Co., Inc., Irving M. 100
Solvay Sales Corporation ..... Cover 2
Starkie Co., A. E. 57
Starkweather Co., J. U. 100
Stauffer Chemical Co. 68
Stroock & Wittenberg Corp. 89

Tennessee Corp. 99
Texas Gulf Sulphur Co. ..... Pages 30 and 96
Turner & Co., Joseph 85

Union Carbide & Carbon Corp. ..... Pages 1 and 43
U. S. Industrial Alcohol Co. ..... Insert facing pages 48 and 49
U. S. Industrial Chemical Co. ..... Insert facing pages 48 and 49
U. S. Phosphoric Products Corp. 99
U. S. Potash Co. 92

Victor Chemical Works 39

Warner Chemical Co. ..... Pages 8 and 9
Wishnick-Tumpeer, Inc. ..... Cover 4



"We"—Editorially Speaking

Our CHEMICAL SPECIALTIES CATALOG will be out in October in one volume with the 14th annual edition of the CHEMICAL BUYER'S GUIDEBOOK—and it will come close to adding half again as many pages to that tome. We under-guessed the size of this growing branch of the chemical business when we estimated some ten to twelve thousand trade and brand names. We have eighteen thousand plus and more being added daily.

❖❖❖❖

If you make any chemical specialties for industry, don't fail to mail your questionnaire with your trade names before the end of July. There's no charge for complete listing.

❖❖❖❖

Alan Claflin in Boston (who ought to know) tells us that the correct definition of a chemical specialty is "a little chemical sold with a lot of brains."

❖❖❖❖

And some of the brainiest specialty makers are buying advertising in the first and only chemical specialty buying guide ever published.

❖❖❖❖

The line forms on the right.

❖❖❖❖

'Way back at the Swampscott meeting of the A.C.S., ten summers since, one of the best papers of the symposium on the economics of nitrogen was read by Charles J. Ramsburg on sulfate of ammonia. Last winter he delivered a Brackett Foundation lecture at Princeton on coal-tar, and that paper, somewhat revised, is to be published in our August issue. Vice-president of Koppers, Mr. Ramsburg knows, and when he writes, which is all too seldom, he does so with real authority.

❖❖❖❖

One of the Brackett lecturers announced for next winter is Monsanto's vice-president in charge of research, Gaston du Bois. Possibly because Jasper Crane is on the Committee in charge of these famous Princeton addresses, there are many names familiar in chemical industry among the members of the Guild of Brackett Lecturers, such as James H. Critchett, Frederick M. Becket, J. V. N. Dorr, Williams Haynes, E. R. Weidlein.

❖❖❖❖

Isn't it funny how big inventory looks when it is piling up, and how fast it seems small when shipments begin?

Another week of good stock market and even those prognosticators who have been saying that a rise in Wall Street will be the first sign of reviving business activity will begin to believe themselves.

❖❖❖❖

As if the country wasn't stumped already, even F. D. R. has to go off electioneering across the continent.

❖❖❖❖

But we note with joy that Garner goes fishing and Farley takes a trip to Alaska.

❖❖❖❖

For we understand that they are the brightest political brains in Washington.

Fifteen Years Ago

From our issues of July, 1923

J. Enrique Zanetti, assistant professor chemistry, Columbia, appointed member committee of League of Nations, to investigate question of chemical warfare.

T. W. Sill, chairman, Chemical Salesmen's Association Committee, reports satisfactory progress on work of solving returnable package problem.

American Chemical Paint Co., Phila., to build new plant at Ambler, Pa.

C. C. Concannon appointed chief, Chemical Division, Department of Commerce.

B. P. Steele now sales manager for W. F. George Chemicals, Inc., New York City.

J. F. Wischhusen, president, Superfos Co., returns from extended European trip, and reports Europe recovering.

Dewey & Almy, Cambridge, Mass., is building a one-story addition.

In prize essay contests on technical training and salesmanship, submitted by students in chemical courses in New York and Philadelphia, first prize winner is C. F. Wolters, Consumers Chemical; second, A. J. Mathey, Mathieson Alkali; third, Wilson I. Doan, Dow Chemical.

Du Pont chooses Old Hickory property, Jacksonville, Tenn., for site of new $4,000,000 silk fibre plant.

Sitting at the desk of the sales manager of one of New England's largest chemical distributors last week, we heard him in one-half hour enter the following telephone orders:

1 lb. sulfur.
1 lb. palm oil.
1 pt. castor oil.

These in two orders and from large industrial firms.

❖❖❖❖

You can figure for yourself what it cost the firm to enter, bill, pack and deliver these—one four miles and the other nine miles from their warehouse.

❖❖❖❖

While the total value of all manufactured goods trebled, the horse power used by all American manufacturing doub'ed; but they bought four times as much chemicals, which is one way of indicating that the Chemical Revolution is here.

❖❖❖❖

Did you know that—

The consumption of gas black other than made by the cannel process increased from 40 to 60 million pounds in 1937 against 1936.

The Fargo rowing in the Yale freshman crew is the son of Calco's vice-president.

There are forty-one new advertisers in the forthcoming edition of the CHEMICAL BUYER'S GUIDEBOOK, and the closing date is August first (advt.).

❖❖❖❖

In view of the new "pump-priming" program, the following excerpt from our Guest Editorial, referring to Sir Ernest Benn's address, published just one year ago, we quote:

"The time is ripe for a revolt against the notion that the vote can take the place of work and value. In such a revolt the business classes have rather a good story to tell. We are the people who made civilization, and we are the only people who can save it. We contribute 1,000 millions a year in taxes for all the madness of politics. We submit to every sort of interference and are out of the picture. If something wants doing, a committee is formed of politicians and bureaucrats to decide how it is to be done. It is never thought wise to leave it to business forces to do the job better, quicker and cheaper. Only when the business classes once more assert themselves will life in general become once more happy and contented and useful."

HNOLOGY DEPT.

VOL. 43 July '38

CHEMICAL INDUSTRIES

Statistical and Technical Data Section

NO. 1 Part 2

PUBLIC LIBRARY JUL 21 1938 DETROIT

State of Chemical Trade

Current Statistics (June 30, 1938)—p. 13

WEEKLY STATISTICS OF BUSINESS

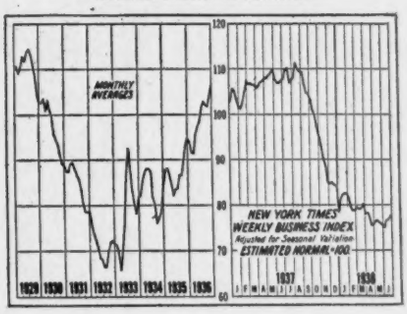
Week Ending	Carloadings 1938	Carloadings 1937	Carloadings % of Change	Electrical Output* 1938	Electrical Output* 1937	Electrical Output* % of Change	Jour. of Com. Price Index	Nat'l Fertilizer Ass'n Price Indices: Chem. & Drugs	Fats & Oils	Fert. Mat.	Mixed Fert.	All Groups	†Labor Dept. Chem. & Drug Price Index	% Steel Activity	N. Y. Times Index Bus. Act.	Fisher's Index Pur. Power
May 21	545,808	775,034	—29.6	1,967,807	2,198,646	—10.5	77.5	94.0	59.7	71.5	76.8	74.7	76.4	29.0	76.0	122.8
May 28	562,061	790,503	—28.9	1,973,278	2,206,718	—10.6	76.9	94.0	58.3	71.5	76.8	74.2	76.0	26.1	75.7	123.8
June 4	502,624	688,987	—27.0	1,878,851	2,131,092	—11.8	77.0	94.0	57.2	69.0	76.8	73.8	75.9	26.2	75.0	124.2
June 11	553,854	750,500	—26.2	1,991,787	2,214,166	—10.0	77.9	94.0	58.2	68.9	76.8	74.4	75.9	27.1	76.5	123.9
June 18 ...	555,569	752,787	—26.2	1,991,115	2,213,783	—10.1	77.0	93.7	59.1	69.0	76.8	74.5	75.8	28.0	76.8	123.4
June 25	558,937	769,945	—27.4	.....	.....	....	76.4	93.7	60.8	69.1	76.8	74.1	...	....	77.4	123.3

* K.W.H., 000 omitted; † 1926-1928 = 100.0.

MONTHLY STATISTICS

CHEMICAL:	May 1938	May 1937	April 1938	April 1937	March 1938	March 1937
Acid, sulfuric (expressed as 50° Baumé, short tons, Bureau of the Census)						
Total prod. by fert. mfrs.	.....		176,703	.....	180,040	154,379	193,979
Consumpt. in mfr. fert.	.....		146,301	.....	172,936	129,233	196,134
Stocks end of month	.....		67,475	.....	68,352	93,319	72,585
Alcohol, Industrial (Bureau Internal Revenue)						
Ethyl alcohol prod., proof gal.	14,226,450	16,938,983	12,739,423	16,824,151	18,305,610	19,873,456
Comp. denat. prod., wine gal...	899,696	921,937	297,743	255,623	130,577	260,002
Removed, wine gal.	823,778	919,461	300,348	261,524	121,517	226,422
Stocks end of mo., wine gal.	641,284	794,475	546,054	792,893	549,026	799,919
Spec. denat. prod., wine gal. ...	5,190,640	6,515,668	5,989,710	6,843,259	6,076,362	6,292,297
Removed, wine gal.	5,268,695	6,591,728	6,063,471	6,454,712	6,048,474	6,309,500
Stocks end of mo., wine gal.	495,937	783,906	581,235	864,449	663,519	479,888
Ammonia sulfate prod., tons *a*.	32,000	71,903	34,344	69,820	36,134	71,592
Benzol prod., gals. *b*	4,905,000	10,448,000	5,385,000	10,328,000	5,998,000	110,737,000
Byproducts coke, prod., tons *a*	2,282,621	4,478,667	2,436,264	4,348,826	2,675,071	4,494,563
Cellulose Plastic Products (Bureau of the Census)						
Nitrocellulose sheets, prod., lbs.	415,981	1,237,034	453,596	1,239,686	481,134	1,371,819
Sheets, ship., lbs.	503,539	1,072,196	525,132	1,174,223	607,496	1,251,331
Rods, prod., lbs.	212,167	297,904	199,119	347,078	214,784	334,841
Rods, ship., lbs.	192,875	315,409	201,392	358,330	263,186	309,714
Tubes, prod., lbs.	40,096	91,860	37,989	105,171	57,994	87,901
Tubes, ship., lbs.	58,610	62,086	51,179	95,570	73,396	78,329
Cellulose acetate, sheets, rods, tubes						
Production, lbs.	257,722	1,170,106	249,185	1,410,637	168,073	1,621,103
Shipments, lbs.	253,491	1,098,812	259,209	1,313,195	202,715	1,764,311
Methanol (Bureau of the Census)						
Production, crude, gals.	.....		522,961	314,664	531,727	432,800	546,662
Production, synthetic, gals. ...	.....		2,353,497	1,925,999	2,138,895	2,343,828	2,071,747
Pyrozylin-Coated Textiles (Bureau of the Census)						
Light goods, ship., linear yds...	.....		3,664,620	2,596,269	4,314,429	2,827,462	4,769,506
Heavy goods, ship., linear yds.	.....		2,062,580	1,640,483	2,451,581	1,913,336	2,642,703
Pyroxylin spreads, lbs., *c*	.....		5,555,434	4,334,123	7,155,521	4,943,100	7,803,471
Exports (Bureau of Foreign & Dom. Commerce)						
Chemicals and related prod. *d*..	.....		.....	$11,459	$12,385	$11,560	$12,139
Crude sulfur *d*	$956	$1,229	$1,130	$767	$717	$499
Coal-tar chemicals *d*	$980	$1,748	$1,025	$1,422	$1,047	$1,366
Chemical specialties *d*	.....		.....	$2,508	$2,521	$2,307	$2,405
Industrial chemicals *d*	$2,088	$2,946	$2,269	$2,463	$2,136	$2,596
Imports						
Chemicals and related prod. *d*.	.....		.....	$6,728	$11,020	$7,804	$10,775
Coal-tar chemicals *d*	$1,579	$1,600	$1,256	$1,742	$961	$1,438
Industrial chemicals *d*	$1,188	$2,632	$1,159	$2,676	$1,766	$2,833
Payrolls (U. S. Dept. of Labor, 3 year av., 1923-25 =100)						
Chemicals and allied prod., including petroleum	117.9	136.7	116.3	136.4	119.4	128.1
Other than petroleum	111.4	136.2	110.9	136.2	114.5	128.8
Chemicals	116.2	152.5	116.6	150.6	117.6	140.2
Explosives	86.0	103.2	86.5	107.6	90.9	97.5
Employment (U. S. Dept. of Labor, 3 year av., 1923-25 =100)						
Chemicals and allied prod., including petroleum	107.5	124.5	110.4	126.6	113.0	124.9
Other than petroleum	105.0	124.6	108.6	127.7	111.8	126.0
Chemicals	107.8	137.5	109.4	135.6	110.5	134.0
Explosives	84.8	90.7	86.0	92.4	87.2	90.2
Stocks of chemicals, etc.:**						
Finished	.....	144	183	148	188	154
Raw material	.....	75	92	75	100	78
Price index chemicals	.....	.....	.....	94.2	83.2	95.3
Chem. and drugs	.....	.....	.....	86.9	78.7	87.5
Fert. mat.	.....	.....	.....	70.7	71.8	70.3
Mixed fert.	.....	.....	.....	72.0	71.6	71.7

Industrial Trends



Business: The first two weeks of June saw business activity drop sharply to a new low point for the current recession. However, just when any upturn was least expected the pendulum began to swing in the opposite direction, and the last half of the month witnessed an improvement. Sentiment became markedly better.

Steel: Price cuts have been made in an effort to stimulate the placing of immediate business. Opinion is becoming more prevalent in the steel industry that the seasonal upturn in operations will begin early in September or even in the latter part of August. The "big push" at that time is expected to come largely from the automotive field. Current estimates of September operations run around 40 to 45%. Steel activity in the past month rose slightly from the low week of May 31, but did not reach the 30% mark.

Automobiles: A more hopeful note comes from the Detroit automotive area, probably largely based on the sudden turn in the stock market, with the attendant likelihood that the purchasing power of the country will show gains. Better sentiment is all that is needed to stimulate car sales. While the industry as a whole does not look for any rush over the summer months, it is now of the opinion that a decided pick-up will come with the introduction of the '39 models. June production is estimated at 160,000-180,000 units, just about a third of the output in the same month of last year.

Retail Trade: After a slow start retail trade picked up briskly in the final half of June, largely on items of a seasonal nature. More and more com-

State of Chemical Trade
Current Statistics (June 30, 1938)—p. 13

State of Chemical Trade

Current Statistics (June 30, 1938)—p. 14

plaints are being registered by customers concerning the lack of adequate stocks in retailers' hands.

Wholesale Trade: A new buying spurt was reported in wholesale channels. This is not surprising for it has been an acknowledged fact that retailers were poorly stocked and any revival in purchasing would be bound to start the ball rolling. Retailers, however, are still buying very cautiously and in relatively small quantities for immediate delivery. A decided impetus was given to fall purchasing when the stock and commodity markets did a right about face in the middle of the month. The rise in the stock market has forced buyers to revise their earlier estimates of fall trade; should stocks continue to advance further over the normally dull summer period the fall season may yet prove to be a good one in most lines.

Employment: May employment in nonagricultural lines showed a dip of 300,000. The decrease represented contra-seasonal decreases in manufacturing, mines and the railroads and seasonal layoffs in retail and wholesale trade. Of course the sudden slight improvement in business last month, if continued, may change the trend in unemployment.

Textiles: Considerable improvement in sales of cotton goods took place last month, thereby aiding the inventory situation. Little change was noted, however, in manufacturing operations in cotton, silk, or wool. Rayon producers have, in a few instances, increased their level of operations.

Carloadings: Weekly figures still make poor comparison with last year's totals. Of course, it is well to remember that in June of '37 business activity was still very close to the peak period for the year. Later months of the current year should show up better in similar comparisons.

Outlook: While many hold that there is little in the current outlook to sustain the bullish sentiment in Wall Street, there is no gainsaying the fact that the rise last month has given renewed hope to many that the country has passed out of the worst part of the present recession. As indicated in these columns last month the inventory situation is the brightest spot; buyers in the past few weeks have come into the market in larger numbers, fearing that they would "miss the boat" if they did not arrange to cover at least a part of their forward requirements. A fairly busy summer period is almost certain assurance that the fall will see rising markets and a revival in manufacturing.

MONTHLY STATISTICS (cont'd)

	May 1938	May 1937	April 1938	April 1937	March 1938	March 1937
FERTILIZER:						
Exports (short tons, Nat. Fert. Association)						
Fertilizer and fert. materials ..	.....		186,182	158,717	137,607	172,296	106,297
Ammonium sulfate	.....		8,216	118	12,359	686	519
Total phosphate rock	.....		156,017	132,573	102,562	131,830	73,977
Total potash fertilizers	.....		8,642	11,073	9,712	7,031	3,199
Imports (short tons, Nat. Fert. Association)							
Fertilizer and fert. materials ...	.....		199,503	159,614	283,366	189,265	253,806
Ammonium sulfate	.....		7,271	10,493	7,456	10,204	5,630
Sodium nitrate	.....		5,273	96,688	153,449	91,426	97,979
Total potash fertilizer	.....		15,671	6,561	36,905	22,322	55,193
Superphosphate e (Nat. Fert. Association)							
Production, bulk			227,223	286,685	220,166	307,834	257,595	371,164
Shipments, total			410,067	482,824	756,121	849,386	664,739	768,666
Northern area			262,122	312,329	350,467	350,017	235,742	224,558
Southern area			147,945	170,495	405,654	499,369	428,997	544,108
Stocks, end of month, total ...			1,034,204	804,816	1,179,223	960,552	.....	.....
Tag Sales (short tons, Nat. Fert. Association)							
Total, 17 states			331,568	309,542	1,108,005	1,399,151	1,592,939	1,872,296
Total, 12 southern			275,761	265,502	1,039,765	1,329,605	1,521,234	1,753,416
Total, 5 midwest			55,807	44,040	68,240	69,546	71,705	118,880
Fertilizer payrolls			97.1	116.2	121.1	150.9	110.7	127.6
Fertilizer employment			91.1	104.6	123.0	151.6	116.7	135.9
Value imports, fert. and mat. *d*			$2,880	$3,916	$3,580	$5,473	$4,261	$5,587
Value exports, fert. and mat. *d*			.....	.....	$1,520	$1,356	$1,670	$1,194
GENERAL:								
Acceptances outst'd'g *f*			$268	$385	$278	$395	$292	$396
Coal prod., anthracite, tons ...			.....	.....	3,108,000	6,854,000	4,015,000	4,235,094
Coal prod., bituminous, tons ...			.....	.....	22,195,000	26,041,000	26,745,000	.....
Com. paper outst'd'g *f*			$251	$286	$271	$285	$296	$290
Failures, Dun & Bradstreet ...			1,053	834	1,116	786	1,088	820
Factory payrolls *i*			69.4	105.2	70.7	104.9	73.3	101.1
Factory employment *i*			77.5	102.3	79.6	102.1	81.7	101.1
Merchandise imports *i*			$148,260	$284,735	$155,501	$280,899	$173,405	$307,474
Merchandise exports *i*			$257,177	$289,922	$274,482	$268,945	$275,711	$256,565
GENERAL MANUFACTURING:								
Automotive production			192,068	516,919	219,314	536,150	221,951	494,121
Boot and shoe prod., pairs			.....	35,410,552	32,859,000	40,297,606	37,059,982	45,803,218
Bldg. contracts, Dodge *j*			$283,156	$244,112	$222,016	$270,125	$226,918	$231,246
Newsprint prod., U. S., tons ...			68,001	79,024	58,836	78,642	67,864	82,576
Newsprint prod., Canada, tons..			207,678	310,650	200,794	298,347	224,604	301,110
Plate glass prod., sq. ft.			.....	.....	.....	.....	3,802,112	20,742,575
Steel ingot prod., tons			1,806,805	5,151,909	1,925,166	5,070,867	2,011,840	5,216,243
% steel capacity			30.39	88.79	33.44	90.25	33.84	89.90
Pig iron prod. tons			1,255,024	3,537,231	1,376,141	3,391,665	1,452,487	3,459,473
U. S. consumpt. crude rub., tons			28,947	51,795	27,984	51,589	30,487	54,064
Cotton consumpt., bales			425,684	669,665	414,392	718,975	510,941	776,942
Cotton spindles oper.			21,341,750	24,656,284	21,786,054	24,727,106	22,288,098	24,640,046
Silk deliveries, bales			28,687	.....	33,381	40,561	34,884	39,934
Rayon ship., index *p*			444	724	444	702	455	693
Rayon employment *i*			304.0	384.0	303.1	378.1	334.3	373.3
Rayon payrolls *i*			275.0	382.0	260.3	364.8	300.4	349.7
Soap employment *i*			91.6	103.3	93.8	107.6	96.0	111.0
Soap payrolls *i*			107.2	113.8	108.5	116.4	111.8	123.2
Paper and pulp employment *i* ..			105.4	120.2	106.9	119.1	108.1	117.6
Paper and pulp payrolls *i*			98.7	121.8	99.9	119.6	103.4	116.5
Leather employment			73.6	99.1	74.6	100.0	76.4	98.8
Leather payrolls *i*			74.5	110.0	74.4	111.4	78.2	107.3
Glass employment *i*			80.7	112.3	81.8	110.9	83.7	110.1
Glass payrolls *i*			78.3	118.9	77.1	120.2	80.8	115.1
Rubber prod. employment *i*			71.5	103.6	72.7	96.7	72.9	96.7
Rubber prod. payrolls *i*			63.1	109.2	61.7	100.3	60.6	99.8
Dyeing and fin. employment *i*..			102.1	118.8	103.4	123.1	104.9	123.1
Dyeing and fin. payrolls *i*			83.6	106.2	85.9	114.6	89.0	112.6
MISCELLANEOUS:								
Oils and fats, price index			.....	.....	.....	.....	.....	130.2
Price index K, rosin			.....	.....	.....	.....	.....	152.7
Gasoline prod., bbls.			.....	.....	46,025	44,243	45,352	45,141
Cottonseed oil consumpt., bbls			273,266	189,000	231,975	207,405	.....	.....
Price index, turpentine			.....	.....	.....	.....	.....	75.3
PAINT, VARNISH, LACQUER, FILLERS:								
Sales 680 establishments			.....	.....	$34,721,597	$46,345,474	$30,728,890	$39,498,071
Trade sales (580 establishments)			.....	.....	$20,861,998	$25,102,366	$17,227,950	$19,398,445
Industrial sales, total			.....	.....	$10,392,707	$16,759,108	$10,417,161	$16,601,194

a Bureau of Mines; *b* Crude and refined plus motor benzol, Bureau of Mines; *c* Based on 1 lb. of gun cotton to 7 lbs. of solvent, making an 8-lb. jelly; *d* 000 omitted, Bureau of Foreign & Domestic Commerce; *e* Expressed in equivalent tons of 16% A.P.A.; *f* 000,000 omitted at end of the month; *i* U. S. Dept. of Labor, 3 year average, 1923-25 = 100; *j* 000 omitted, 37 states; *p* Rayon Organon, 1923-25 = 100; *q* 680 establishments, Bureau of the Census; *r* Classified sales, 580 establishments, Bureau of the Census; *s* 53 manufacturers, Bureau of the Census; *v* In thousands of bbls., Bureau of the Census; ** Indices, Survey of Current Business, U. S. Dept. of Commerce.

Price Trend of Representative Chemical Company Stocks

	May 31	June 17	June 24	June 30	Net Gain or loss last mo.	Price on June 30, 1937	1938 High	1938 Low
Air Reduction	43	46	55	60¾	+17¾	69⅝	62½	40
Allied Chemical	137½	147½	168½	172	+34½	217½	176½	124
Amer. Cyanamid "B"	15¾	17⅛	...	23	+ 7¼	30⅛	26⅝	15½
Amer. Agric. Chem.	...	...	62½	62½	..	88	66	49
Columbian Carbon	66½	70	80	83	+16½	117	85	53¾
Commercial Solvents	6⅛	7⅜	8⅛	8	+ 1⅞	13⅛	10	5⅜
Dow Chemical	93½	...	111½	125½	+32	135	133	87⅞
Du Pont	92½	96⅞	111	119¾	+27¼	153	123⅜	90½
Hercules Powder	...	43¾	53⅛	54½	..	152	58	42¾
Mathieson Alkali	21½	...	25¼	21½	..	32⅝	27½	19¾
Monsanto Chemical	70	78¾	85½	89½	+19½	89	94½	67
Std. of N. J.	44⅜	46¼	53⅝	52⅞	+ 8½	...	54⅛	39¾
Texas Gulf Sulphur	28½	31⅜	32⅞	34	+ 5½	35	35	26
Union Carbide	60⅝	65⅝	75⅛	77¼	+16⅝	99¼	80¾	57
U. S. Ind. Alcohol	15¼	17	19⅝	22¼	+ 7	30	23¾	13½

Total market value of shares listed on the N. Y. Stock Exchange rose $7,377,260,351 last month, according to a compilation issued by the Exchange. The average price a share of all listed stocks on July 1, was $29.41, compared with $24.28 at the beginning of June.

On July 1, there were 1,256 issues listed, aggregating 1,426,893,438 shares, with a total market value of $41,961,875,154. This compared with 1,251 issues listed on June 1, aggregating 1,424,479,669 shares and having a total market value of $34,584,614,803.

The sharp rise enjoyed by the chemical group brought the total value for these shares up to $5,210,253,297 and the average price to $58.40.

Report of American I. G. for fiscal year ended March 31, 1938, certified by independent auditors, shows net income of $4,186,110, including $502,291 net profit on sale of securities, and after interest, normal federal income taxes and other deductions, equal under the participating provisions of the shares, to $5.26 a share on 495,448 no-par shares of Class A common stock and 52 cents a share (par $1) on 3,000,000 shares of Class B common stock.

This compares with net income in preceding year of $4,684,769, including $1,166,093 net profit on sale of securities, equal to $5.89 a share on 494,227 shares of Class A common stock and 59 cents a share on 3,000,000 shares of Class B common stock.

Total assets as of March 31, 1938, were $66,883,553, comparing with $69,068,782 on March 31, 1937. Capital surplus was $14,573,571 and earned surplus was $10,970,981, compared with capital surplus of $14,284,473 and earned surplus of $10,100,934 at end of preceding year. Appropriated earned surplus for debenture retirement was $6,380 on March 31, last, compared with $816,380 a year previous.

Balance sheet as of March 31, 1938, shows cash of $1,958,081; marketable securities (at cost or lower) of $28,673,281; sundry investments (at cost) $787,521 and investments in stocks of subsidiary companies (at cost or lower) of $27,007,558. This compares with cash of $2,898,134; marketable securities of $32,644,543; sundry investments of $213,702 and investments in stocks of subsidiary companies of $26,895,164 at end of preceding year.

Public offering was made July 7 of two issues of Standard Oil Co. of N. J., covering $50,000,000 15-year 2¾% debentures and $35,000,000 serial notes, of which $4,000,000 were excluded from offering. The securities were underwritten by a group headed by Morgan Stanley & Co.

The debentures are priced at 99% with 97¼% proceeds going to the company. The notes, which carry rates from 1¾% to 2½% on maturities ranging from 1943 to 1947, are priced at par. Proceeds to the company are 98¾%.

The proceeds will be used for capital purposes, but no specific allocations have been made. Placed in the general funds of the company, they will be advanced to subsidiaries for capital expenditures, for inventory financing and other purposes.

The expansion program under study contemplates capital expenditures of approximately $175,000,000 during the current year of which $39,000,000 were spent during the first quarter. Approximately $90,000,000 would be devoted to the acquisition and development of crude reserves, $38,000,000 for refining, $15,000,000 for tankers, $24,000,000 for marketing facilities, with $8,000,000 for miscellaneous purposes. However, the prospectus says, business developments may result in changes in the program as now contemplated.

For the year 1937 profits before the parent company's fixed charges totaled $154,227,272 and fixed charges $6,234,125. The respective figures for the previous year were $104,116,266 and $6,341,683.

In its registration statement filed with SEC, Industrial Rayon Corp. states a portion of the $7,500,000 bonds covered will be used for expenditures in its new Painesville plant.

Dividends and Dates

Name	Div.	Stock Record	Payable
Abbott Labs., pfd., q.	$1.12½	July 1	July 15
Air Reduction, q.	25c	June 30	July 15
Am. Cyanamid A. & B., q.	15c	June 15	July 1
Am. Smelt. & Ref.	50c	Aug. 5	Aug. 31
Can. Ind., A. & B.	$1.50	June 30	July 30
Can. Ind., pf., q.	$1.75	June 30	July 15
Celanese Corp., 7% pr. pf., q.	$1.75	June 17	July 1
Colgate-Palmolive-Peet, pf., q.	$1.50	June 6	July 1
Corn Prods. Ref., q.	75c	July 5	July 20
Corn Prods. Ref., pf., q.	$1.75	July 5	July 15
Devoe & Raynolds, pf., q.	$1.75	June 25	July 1
Devoe & Raynolds, Cl. B.	25c	June 25	July 1
Devoe & Raynolds, Cl. A.	25c	June 25	July 1
Dow Chemical	75c	July 30	Aug. 15
Dow Chemical, pf., q.	$1.25	July 30	Aug. 15
Du Pont, $4.50 pf., q.	$1.12½	July 8	July 25
Du Pont, deb., q.	$1.50	July 8	July 25
Eagle Picher Lead, pf., q.	$1.50	June 15	July 1
Eastman Kodak, q.	$1.50	June 4	July 1
General Paint Corp., pf., q.	66c	June 18	July 1
General Printing Ink	10c	June 20	July 1
General Printing Ink, pf., q.	$1.50	June 20	July 1
Glidden Co., pf	56¼c	June 16	July 1
Hercules Powder, pf., q.	$1.50	Aug. 4	Aug. 15
Int'l Salt Co., q.	37½c	June 15	July 1
Int'l Corp., pf., q.	$1.50	July 20	Aug. 1
Koppers Co., pf., q.	$1.50	June 11	July 1
Liquid Carb., I.	20c	June 15	July 1
Merck & Co., pf., q.	$1.50	June 23	July 1
Monsanto Chem., pf., S.	$2.25	Nov. 10	Dec. 1
Penn Salt Mfg.	$1.00	Aug. 31	Sept. 15
Pittsburgh Plate Glass	25c	June 10	July 1
Pratt & Lambert	25c	June 15	July 1
Procter & Gamble, 8% pf., q.	$2.00	June 24	July 1
Pure Oil, 5% pf., q.	$1.25	June 10	July 1
Pure Oil 5¼% pf., q.	$1.25	June 10	July 1
Pure Oil 6% pf., q.	$1.50	June 10	July 1
Solvay Am. Corp., pf., q.	$1.37½	July 15	Aug. 15
Staley, A. E. Mfg., 7% pf., S.	$3.50	June 20	July 1
Swift & Co., q.	30c	June 1	July 1
Texas Corp., q.	50c	June 10	July 1
Texas Gulf Sulphur, q.	50c	Sept. 1	Sept. 15
Union Carbide & Carbon	40c	June 13	July 1
United Carbon	75c	June 15	July 1
United Dyewood, pf., q.	$1.75	June 10	July 1
Westvaco Chlorine, pf., q.	37½c	July 11	Aug. 1
Young, J. S., q.	$1.50	June 24	July 1
Young, J. S., pf., q.	$1.75	June 24	July 1

I Interim; S, semi-annual.

New plant will have an annual productive capacity of approximately 12,000,000 lbs. of rayon yarn. Company states that expenditures to July 1 in connection with the plant aggregate around $5,218,948, leaving an unpaid cost of $6,281,052, which is to be deposited with trustee of the first mortgage and withdrawn by company from time to time.

A quarterly dividend of 20c a share was voted recently by the Standard Wholesale Phosphate and Acid Works. Previous quarterly payment was 30c on April 15, while a special dividend of 30c was paid on May 25.

Chemical Finances

June 1938—p. 14

Chemical Stocks and Bonds

June Last	1938 High	1938 Low	1937 High	1937 Low	1936 High	1936 Low	Sales	Stocks	Par $	Shares Listed	Dividends*	Earnings** $-per share-$ 1937	1936	1935
							Number of shares June 1938	1938						
NEW YORK STOCK EXCHANGE														
47¾	47¾	36¼	55	36	...	...	1,800	8,000	Abbott Labs.	No	640,000	$2.10	2.51	2.21	1.77
60¾	62½	40	80⅛	44½	86½	58	24,400	172,900	Air Reduction	No	2,566,191	3.00	2.86	2.79	2.05
172	176½	124	258½	145	345	157	15,200	97,100	Allied Chem. & Dye	No	2,214,099	7.50	11.19	11.44	8.71
62½	66	49	101½	53½	89	49	2,600	12,300	Amer. Agric. Chem.	No	210,932	7.75	8.86	4.71	6.37
12¾	14	9	30¾	8¼	35⅜	20½	3,300	35,200	Amer. Com. Alcohol	20	260,930	.50	3.23	4.55	3.16
27¼	30¼	20	46	22	50	37	1,000	9,700	Archer-Dan.-Midland	No	549,546	2.00	5.03	3.05	4.20
49	49	36	94	38	84	48	1,000	14,400	Atlas Powder Co.	No	248,145	2.25	4.40	4.21	2.81
118½	119	105	133	101	131	112	240	1,550	5% conv. cum. pfd.	100	68,597	5.00	20.90	20.85	16.93
16¾	18⅞	9	41¼	13	32¼	21¾	27,100	167,100	Celanese Corp. Amer.	No	1,000,000	2.25	2.04	2.33	1.99
...	...	...	115	90	116	106	....	200	prior pfd.	100	164,818	7.00	27.07	27.25	35.34
10¾	11⅞	7⅛	25¾	8½	21¼	13	26,900	156,800	Colgate-Palm.-Peet	No	1,999,970	.50	—.35	1.40	1.36
87	95½	78	104½	95	106½	100	1,800	7,800	6% pfd.	100	248,197	6.00	3.21	17.13	16.79
83	85	53¾	125¾	65	136½	94	5,100	29,700	Columbian Carbon	No	537,406	6.50	8.31	7.48	5.56
8	10	5⅞	21¾	5	24⅜	14¼	55,200	269,900	Commercial Solvents	No	2,636,878	.60	.60	.85	1.02
68	69	53	71¾	50½	82½	63⅜	14,200	90,800	Corn Products	25	2,530,000	3.00	2.52	3.86	2.62
165¼	166½	162	171½	153	170	158	200	2,800	7% cum. pfd.	100	245,738	7.00	32.96	46.76	33.97
34	39¼	25	76⅛	29½	63	42	1,690	8,550	Devoe & Rayn. A	No	95,000	3.25	4.05	4.49	2.89
125½	133	87⅞	159¼	79½	142¼	94⅜	5,700	40,300	Dow Chemical	No	945,000	3.35	4.17	4.48	3.29
119¾	123⅜	90½	180⅛	98	184¾	133	93,800	448,300	DuPont de Nemours	20	11,041,437	6.25	7.37	7.54	5.04
115⅞	116	109½	112	107½	...	...	2,600	16,100	4½% pfd.	No	500,000	4.50	165.48	.....	.....
135	137	130¾	135½	130	136½	129	1,000	7,700	6% cum. deb.	100	1,092,948	6.00	81.70	84.21	56.81
169½	174	121½	198	144	185	156	15,800	83,300	Eastman Kodak	No	2,250,921	7.50	9.76	8.23	6.90
166	171	157	164	150	166	152	440	1,460	6% cum.	100	61,657	6.00	362.45	306.64	258.09
28	28¾	19⅞	32¼	18	35⅝	23½	15,600	108,200	Freeport Texas	10	796,380	1.50	3.30	2.43	1.78
9½	10	6¾	19	8½	18	9½	3,200	36,900	Gen. Printing Ink	1	735,960	1.20	1.32	1.32	.97
22¾	27¼	13	51½	19⅛	55¼	39½	14,400	86,000	Glidden Co.	No	799,701	2.60	2.62	3.29	2.74
42	51½	37	58¼	43	56	52¾	500	3,800	4½% cum. pfd.	50	199,940	2.25	12.72	15.43	13.23
88	95	76¾	117½	80⅛	133	99¾	1,400	7,400	Hazel Atlas	25	434,474	6.56	6.67	6.55	7.58
54½	58	42¾	92½	50	75	42	10,000	60,000	Hercules Powder	No	1,316,710	2.62	2.97	3.24	2.12
131	131½	126¾	135½	125	135	126	250	1,320	6% cum. pfd.	100	96,194	6.00	50.75	48.97	36.30
20	22	14⅜	47½	15	41⅜	25⅝	10,200	87,000	Industrial Rayon	No	759,325	2.00	.34	2.24	1.00
22	25	15	64¼	20	48	37	4,200	30,900	Interchem.	No	289,058	2.00	1.44	3.02	2.21
83	98	80	111½	92	112	107	190	1,300	6% pfd.	100	66,917	6.00	12.26	18.97	16.15
2⅞	3⅞	2	9⅛	2	5⅞	2⅞	5,900	56,100	Intern. Agricul.	No	438,048	...	.16	—1.55	—.99
24¾	29	15	63½	18¼	47¼	22¾	1,900	16,500	7% cum. pr. pfd.	100	100,000	3.00	7.70	.23	2.69
49⅜	52¾	36⅞	73⅛	37	66⅜	43¼	215,600	1,280,900	Intern. Nickel	No	14,584,025	2.25	3.31	2.40	1.65
23½	24	19½	28¾	19½	30	23	200	6,300	Intern. Salt	No	240,000	1.75	2.17	1.70	1.32
22½	24	19¾	36	19¼	36¾	29¼	400	3,000	Kellogg (Spencer)	No	500,000	1.60	2.81	2.62	2.22
38	42	23¼	79	33⅜	80¼	47⅛	24,400	142,900	Libbey Owens Ford	No	2,506,117	4.00	4.19	4.14	3.26
18½	20	12⅛	26⅞	14	46½	32½	5,400	39,700	Liquid Carbonic	No	700,000	2.75	2.37	1.58	1.29
26½	27½	19¾	41¾	22	42⅜	27½	5,000	30,700	Mathieson Alkali	No	828,191	1.65	1.81	1.76	1.44
89½	94½	67	107½	71	103	79	20,500	97,700	Monsanto Chem.	No	1,114,388	3.00	4.40	4.01	3.45
113½	114⅛	111	109	105	...	...	150	550	4½% pfd.	No	50,000	4.50	99.98	.....	.....
27½	29¾	17⅛	44	18	36½	26¾	45,800	228,500	National Lead	10	3,098,310	.50	.95	1.71	1.08
154	159	154	171	153	171	155	400	1,800	7% cum. "A" pfd.	100	243,676	7.00	22.86	33.83	25.40
134	136	127	150	127	147	137¾	350	1,400	6% cum. "B" pfd.	100	103,277	6.00	43.77	74.50	49.05
15½	19¼	9⅞	41¾	10⅛	40	9	69,100	420,000	Newport Industries	1	519,347	.50	2.22	.98	.57
65½	70⅛	40	103¾	51¼	82	64	25,700	149,400	Owens-Illinois Glass	12.50	2,661,204	4.00	3.51	3.80	2.09
50¾	51¾	39½	65½	43¼	56	40¼	16,300	96,400	Procter & Gamble	No	6,325,087	2.75	4.08	2.39	2.23
116½	122¼	116¼	118½	114½	122½	115¾	640	4,660	5% pfd.	100	169,517	5.00	157.05	94.14	88.15
15¾	18¼	10	34¾	14⅞	28¼	14¾	17,900	100,200	Shell Union Oil	No	13,070,625	1.00	1.44	1.35	.37
101¾	103⅛	93	105⅜	91	127½	102	2,200	13,000	5½% cum. pfd.	100	379,798	5.00	60.59	57.20	17.92
30½	34¾	18½	60⅝	26½	47⅜	19½	13,100	71,900	Skelly Oil	No	1,006,348	1.50	6.07	4.42	2.17
91	93	84	102¼	88	132	97⅜	200	2,300	6% cum. pfd.	100	66,300	6.00	97.86	73.16	39.00
31½	35½	24¾	50	26¼	48½	32¾	52,000	253,500	S. O. Indiana	25	15,235,323	2.30	3.06	3.09	1.98
52⅞	54⅜	39¾	76	42	70⅜	51⅞	85,500	590,600	S. O. New Jersey	25	26,224,767	2.50	5.64	3.73	2.39
7	8	3⅞	15⅜	5¼	13	5⅝	7,000	72,700	Tenn. Corp.	5	853,696	.35	1.09	.41	.22
43⅜	44⅞	32⅝	65⅛	34¾	55¼	28⅞	114,300	588,300	Texas Corp.	25	11,386,253	2.25	5.02	4.10	1.57
34	35	26	44	23¾	44¾	33	14,200	192,600	Texas Gulf Sulphur	No	3,840,000	2.75	3.02	2.57	1.94
77¼	80¾	57	111	61¼	105½	71⅝	82,100	484,100	Union Carbide & Carbon	No	9,000,743	3.20	4.75	4.09	3.06
54½	58	39	91	36¾	96¾	68	7,500	41,600	United Carbon	No	397,885	4.50	5.30	5.54	4.71
22¼	23¾	13½	43⅝	16⅛	59	31¼	7,000	61,400	U. S. Indus. Alcohol	No	391,238	....	1.24	—.20	2.16
17⅝	20⅜	11½	39⅜	9¼	30⅝	16¼	19,300	149,600	Vanadium Corp. Amer.	No	376,637	1.00	2.22	.40	—1.13
15¼	15½	14	...	...	...	...	500	4,700	Victor Chem.	5	696,000	1.12	1.01	1.16	1.13
4½	5⅜	2¾	12¾	2⅜	8½	4⅜	7,700	102,700	Virginia-Caro. Chem.	No	486,708	....	—.05	—2.44	—.79
26	32⅛	15¾	74¾	18½	58¾	28¾	10,900	76,800	6% cum. part. pfd.	100	213,392	1.50	5.88	.44	4.20
16	16⅛	10	27¼	10¾	32	19¾	3,100	13,500	Westvaco Chlorine	No	339,362	1.00	1.46	1.17	1.37
27	27	20	34⅞	21⅛	35¼	31¾	1,400	11,900	cum. pfd.	30	192,000	1.50	4.09	3.26	3.22
NEW YORK CURB EXCHANGE															
23	26⅝	15½	37	17⅝	40¾	29¼	36,300	214,000	Amer. Cyanamid "B"	10	2,520,368	.60	2.09	1.77	1.61
67	82	50	124	69	116¼	99¼	275	1,600	Celanese, 7% cum. 1st pfd.	100	148,179	7.00	22.32	24.47	21.96
3¾	4½	3	15	3	16½	9	100	4,400	Celluloid Corp.	15	194,952	....	—.92	—.80	—.95
9	12	8¼	14⅝	10⅛	15	11⅞	700	800	Courtaulds' Ltd.	£1	24,000,000	9½%	8.64%	8.30%	7.51%
6¾	9⅞	6	10⅝	3½	10¾	5	1,000	10,700	Duval Texas Sulphur	No	500,000	....	.43	.61	.16
35	37½	27	47½	31	55	39	200	2,500	Heyden Chem. Corp.	100	150,000	2.50	3.94	3.56	3.22
93	96¾	55	147½	77	140	98¼	11,300	52,200	Pittsburgh Plate Glass	25	2,142,443	6.50	8.53	7.15	5.32
93½	97¾	66	154¾	72¼	154½	117	7,650	37,850	Sherwin Williams	25	633,927	6.00	8.44	8.04	6.19
110¼	111½	107	114	106¼	116	110	170	1,190	5% cum. pfd.	100	137,139	5.00	44.01	41.44	33.17
PHILADELPHIA STOCK EXCHANGE															
160	160	121½	179	115	179	114¾	350	2,300	Pennsylvania Salt	50	150,000	8.75	11.79	8.57	5.94

June Last	1938 High	1938 Low	1937 High	1937 Low	1936 High	1936 Low	Sales	Bonds	Date Due	Int. %	Int. Period	Outstanding $
NEW YORK STOCK EXCHANGE							June 1938	1938				
104¾	105⅜	99⅛	109½	99	117½	107¾	245,000	1,461,000	Amer. I. G. Chem. Conv.	1949	5½ M-N	$25,300,000
32	33	25⅛	42½	23	42½	27½	147,000	1,146,000	Anglo Chilean Nitrate inc. deb.	1967	4½-5 I	12,067,000
105	106	102⅜	102⅞	100⅛	...	...	26,000	257,000	Dow Chemical	1951	3 J-D	5,000,000
101	101½	100	102	98½	102¾	96¾	13,000	136,000	Int. Agric. Corp. 1st Coll. tr. stpd. to 1942	1942	5 M-N	5,633,000
30½	32⅜	24¾	35⅜	21¼	39	21	154,000	1,035,000	Lautaro Nitrate n inc. deb.	1975	4 J-D	30,500,000
...	...	...	25½	20½	35	23½	.....	21,000	Ruhr Chem.	1948	6 A-D	1,500,000
103¾	103¾	96½	102	93	101¼	94¼	368,000	2,950,000	Shell Union Oil	1951	3½ M-S	58,800,000
102¼	102¼	90¼	102¾	94	102⅞	96⅜	224,000	1,163,000	Skelly Oil	1951	4 J-J	9,000,000
102	102	95	105	93½	105	103	42,000	138,000	Tenn. Corp. deb. "B"	1944	6 M-S	1,600,000
106¼	106½	103½	105¾	100	106	101½	273,000	2,063,000	Texas Corp.	1951	3½ J-D	60,000,000
92½	95	77	111	81	98½	85¾	8,000	226,000	Vanadium Corp. conv.	1941	5 A-O	2,800,000

* Paid in 1937, including extras but excluding dividends paid in stock. ** For either fiscal or calendar years.

Dyes in 1937

The preliminary figures for the U. S. production and sale of dyes and other synthetic organic chemicals in '37, issued by the U. S. Tariff Commission, shows that every group of products increased activity over the preceding year and in most cases represents all-time peak production. Among the coal-tar derivatives, the greatest increases over '36 were shown by medicinals, flavors and perfume materials, and resins. The non-coal-tar synthetics continued to increase in quantity and variety and the output exceeded 2½ billion lbs. in '37. Value of sales of all synthetic chemicals exceeded $280,000,000, of which those from coal tar (including dyes) account for about 58% and the non-coal-tar group about 42%.

Intermediates Up 13%

Peak production of 575,893,000 lbs. of coal-tar intermediates represents an increase of 13% over 1936. Outstanding gains in this group are shown by those largely used in synthetic resins. Phenol production totaled 65,690,000 lbs. or 35% more than in 1936, and the output of 45-211,000 lbs. of phthalic anhydride represented a 45% increase over the preceding year. Statistics for the cresols and maleic anhydride are shown separately for the first time. Other intermediates recording notable increases include b-hydroxy naphthoic acid 21%, and p-dichlorobenzene 22%. Most of the intermediates for dyes were produced in slightly greater quantities than in 1936.

Output of dyes was 2.2% greater than in 1936 and totaled 122,208,000 lbs. Sales increased less than 1% in quantity and slightly over 1% in value. Sales of classified dyes decreased 1.5% in quantity and 2.2% in value while the new and unclassified group shows a 13% increase in quantity and 11% increase in values of sales. This latter group is increasing in importance each year and in 1937 accounted for 14% of the sales quantity and 30% of the sales value of all dyes.

Production of synthetic indigo increased slightly while sales quantity declined slightly as compared with 1936. The sales price averaged 17c per pound as against 16c in the preceding year. Output of sulfur black decreased 7% and sales quantity about 3%.

Lakes and toners increased 12% in production, 6% in sales quantity, and 8% in sales value in 1937 over 1936.

Synthetic medicinals were produced in increased quantity. Sales of those of coal-tar origin amounted to $11,496,045 and of those not of coal-tar origin to $2,408,371. Sales of aspirin increased 25% to 5,143,672 lbs. Sulfanilamide, a very minor item in 1936, showed sales of 267,104 lbs.

Comparison of U. S. Production and Sales of Dyes and Other Synthetic Organic Chemicals, 1925-30, 1936, and 1937

Coal-tar chemicals		1925-30 average	1936	1937	Increase 1937 over 1936
Intermediates:					
Production	Thousands of pounds	267,492	509,706	575,893	13.0
Sales	Thousands of pounds	109,133	223,119	242,194	8.5
Sales value	Thousands of dollars	22,408	31,806	35,639	12.1
Finished coal-tar products:[1]					
Production	Thousands of pounds	138,078	336,348[2]	371,124[3]	10.3
Sales	Thousands of pounds	133,964	287,276[2]	313,797[3]	9.2
Sales value	Thousands of dollars	65,027	120,765[2]	127,414[3]	5.5
Dyes:					
Production	Thousands of pounds	94,003	119,523	122,208	2.2
Sales	Thousands of pounds	92,207	117,573	118,010	.4
Sales value	Thousands of dollars	39,428	63,686	64,531	1.3
Medicinals:					
Production	Thousands of pounds	4,508	12,034	14,800	23.0
Sales	Thousands of pounds	4,106	10,079	11,989	19.0
Sales value	Thousands of dollars	7,464	9,763	11,496	17.8
Flavors and perfume materials:					
Production	Thousands of pounds	3,966	3,481	4,348	24.9
Sales	Thousands of pounds	3,919	3,437	3,899	13.4
Sales value	Thousands of dollars	2,901	3,220	3,967	23.2
Coal-tar resins:					
Production	Thousands of pounds	24,442[4]	117,302[2]	141,099[3]	20.3
Sales	Thousands of pounds	22,135[4]	86,214[2]	108,284[3]	25.6
Sales value	Thousands of dollars	7,756[4]	17,056[2]	20,165[3]	18.2
Non-coal-tar chemicals					
Production	Thousands of pounds	379,972	2,041,456	2,523,893	23.6
Sales	Thousands of pounds	264,006	1,034,921	1,168,058	12.9
Sales value	Thousands of dollars	44,499	105,832	119,375	12.8

[1] Includes color lakes, rubber chemicals and miscellaneous coal-tar products not shown separately.
[2] Does not include resins from coumarone and indene, hydrocarbons, styrol, and sulfonamides.
[3] Does not include resins from adipic acid, coumarone and indene, hydrocarbons, styrol, succinic acid and sulfonamides.
[4] 1927-30 average.

U. S. Production and Sales of Certain Synthetic Resins, 1937

	Production	Sales		
	Pounds	Pounds	Value	Unit value
(A) Coal-tar: Total[1]	141,098,844	108,284,175	$20,164,564	$0.19
Derived from tar acids:				
Cresol or cresylic acid	10,701,463	8,466,610	976,549	.12
Phenol	52,472,160	50,209,349	8,615,827	.17
Phenol and cresols	14,046,283	13,237,663	3,424,791	.26
Xylenols	639,332	642,532	120,133	.19
Xylenols and cresols	1,985,587	989,726	163,570	.17
Alkyd resins:				
Maleic acid	2,803,987	2,154,988	418,183	.19
Phthalic anhydride	58,450,032	32,583,307	6,445,511	.20
(B) Non-coal-tar: Total[2]	21,005,869	18,891,277	5,680,600	.30

[1] Does not include resins from adipic acid, coumarone and indene, hydrocarbon, styrol, succinic acid and sulfonamides.
[2] Includes resins from abalyn-hydrogen-nitrogen, abietic acid, acrylic acid esters, hydrocarbon, ketone, petroleum, terpenes, urea, urea and thiourea, vinyl acetate and chloride, and wood rosin-methyl alcohol.

U. S. Production and Sales of Certain Rubber Chemicals, 1937

	Production	Sales		
	Pounds	Pounds	Value	Unit value
(A) Coal-tar: Total	29,202,343	20,909,372	$8,193,890	$0.39
Accelerators, total	15,166,301	10,782,910	4,503,236	.42
Diphenylguanidine	1,862,029	1,267,226	416,205	.33
Thiocarbanilide	371,256	207,565	47,820	.23
Antioxidants, total	14,036,042	10,126,462	3,690,654	.36
Diphenyl-p-phenylenediamine	688,065	.....	.....	....
(B) Non-coal-tar				
Accelerators:				
Tetramethylthiouram sulfide and disulfide	400,299	326,071	742,115	2.28

Dyes, Synthetic Chemicals, 1937

Production, Sales, p. 2

U. S. Production and Sales of Certain Miscellaneous Synthetic Chemical Products, 1937

	Production	Sales		
	Pounds	Pounds	Value	Unit value
(A) Coal-tar: Total	42,291,554	36,322,184	$8,023,340	$0.22
Photographic chemicals: Total	1,762,201	1,443,755	1,516,327	1.05
Hydroquinol	1,220,253	1,133,139	816,337	.72
Methyl p-aminophenol sulfate (metol) (rhodol)	205,987	.....	.....	....
All other	335,961	310,616	699,990	2.25
Phthalates: Total	15,082,440	13,282,818	2,496,314	.19
Dibutyl	6,963,625	5,760,967	986,295	.17
Diethyl	1,288,491	1,106,939	193,426	.17
All other	6,830,324	6,414,912	1,316,593	.20
Textile chemicals: Total	2,976,622	2,848,664	747,150	.26
(B) Non-coal-tar: Total[1]	2,499,279,901	1,146,173,974	110,280,869	.10
Acetic acid (100% purity)	125,509,931	.....	.....	....
Acetic anhydride (from all sources) (100% purity)	177,488,353	.....	.....	....
Acetin (mono, di, tri)	144,152	130,080	40,378	.31
Acetone	124,012,187	68,772,268	3,586,971	.05
Amyl acetates, total	.....	11,796,710	1,236,678	.10
Amyl alcohols, total	14,205,997	.....	.....	....
Butyl acetates, total	76,352,160	62,167,685	5,382,888	.09
Butyl alcohols, total	124,464,656	40,806,856	3,322,689	.08
Carbon tetrachloride	84,112,245	74,417,244	3,046,448	.04
Chloroform (tech and USP)	2,657,167	1,948,656	335,437	.17
Diacetone alcohol	3,063,136	.....	.....	....
Dibutyl tartrate	22,058	.....	.....	....
Ethyl acetate (85% purity)	63,971,921	44,339,330	2,910,222	.07
Gallic acid, tech.	263,756	.....	.....	....
Isopropyl alcohol (Isopropanol)	131,462,298	.....	.....	....
Isopropyl ether	3,978,267	.....	.....	....
Lactic acid: Edible	927,329	883,961	195,855	.22
Methanol (synthetic)	.....	125,313,631	4,827,626	.04
Methyl chloride (Chloromethane)	3,404,079	3,374,955	1,074,665	.32
Oxalic acid	10,247,541	9,605,180	1,030,137	.11
Pyrogallic acid (Pyrogallol)	115,027	99,812	118,614	1.19

[1] Includes non-coal-tar rubber chemicals.

U. S. Production and Sales of Dyes and Other Finished Coal-Tar Products, 1937

	Production	Sales		
	Pounds	Pounds	Value	Unit value
Dyes:				
Classified	104,499,596	101,585,568	$45,452,524	$0.45
Unclassified	17,708,529	16,424,105	19,078,368	1.16
Total	122,208,125	118,009,673	64,530,892	.55
Color lakes and toners	17,175,911	14,383,400	11,038,799	.77
Medicinals	14,799,771	11,989,359	11,496,045	.96
Flavors and perfume materials	4,347,569	3,898,593	3,966,817	1.02
Resins[1]	141,098,844	108,284,175	20,164,564	.19
Rubber chemicals	29,202,343	20,909,372	8,193,890	.39
Miscellaneous chemicals[2]	42,291,554	36,322,184	8,023,340	.22
Total	371,124,117	313,796,756	127,414,347	.41

[1] Does not include resins from adipic acid, coumarone and indene, hydrocarbon, styrol, succinic acid and sulfonamides.
[2] Includes benzoate of ammonia, benzoate of soda, benzoyl peroxide, biological stains and chemical indicators, poisonous and tear gases, synthetic insecticides, phthalates, synthetic tanning materials, textile assistants, photographic chemicals, and others.

Summary of Production, Sales of Synthetic Organic Chemicals of Non-Coal-Tar Origin, 1937, U. S.

	Production	Sales		
	Pounds	Pounds	Value	Unit value
Medicinals	1,814,035	1,442,070	$2,408,371	$1.67
Flavors and perfume materials	1,792,793	1,550,525	1,005,395	.65
Resins	21,005,869	18,891,277	5,680,600	.30
Miscellaneous[1]	2,499,279,901	1,146,173,974	110,280,869	.10
Total	2,523,892,598	1,168,057,846	119,375,235	.10

[1] Includes non-coal-tar rubber chemicals and all other non-coal-tar synthetic organic chemicals.

valued at $1,322,412 in 1937, the average value being $4.95 per lb. Mandelic acid and salts increased more than 200% in output. Among the outstanding changes were sharp decreases in the prices of the arsphenamines and the several medicinal dyes. Of the medicinals of the non-coal-tar group, amino acetic acid, a relatively new medicinal, increased more than 100% in production, 90% in sales quantity, and 100% in sales value over 1936. Average sales price was $1.86 per lb. as compared with $4.89 in 1933. Further decline in the production and sales of certain barbituric acid derivatives is noted.

Coumarin production increased about 100% and sales about 36%, while the output of vanillin was 17% greater and sales 26% greater than the preceding year. Flavors and perfume materials from coal tar, as a group, increased 25% in production and 23% in sales value. Appreciable increases are also shown for those not of coal-tar origin.

Activity in synthetic resins continues to increase with a record output exceeding 160,000,000 lbs. in 1937 or 20% more than in 1936. For the first time, the output of this class of synthetic products exceeded the output of dyes. The greatest increase is shown in non-coal-tar resins, 34% gain over 1936, followed by alkyd resins with an increase of 30% and tar acid resins 14%.

Chemicals for use in rubber products were produced in somewhat smaller quantities due to smaller output of accelerators. The outstanding increase among miscellaneous coal-tar products was accounted for by the phthalates, production of which increased 47%.

Miscellaneous non-coal-tar synthetics reached the record output of 2,499,000,000 lbs. or 24% more than in 1936. Production of acetic anhydride increased 30% and the increase in output of synthetic acetic acid was even greater. Acetine increased 31%, butyl alcohols 65%, and carbon tetrachloride 23% in 1937 over 1936. A decreased output of 12% is noted for ethyl acetate and 7% for isopropyl alcohol.

ACETIC ACID AND ITS DERIVATIVES: U. S.

(Millions of pounds)

Year	Production: From calcium acetate	Production: By other methods	Production: Total
1927	86.9	12.5	99.4
1928	92.3	20.0	112.3
1929	85.3	43.1	128.4
1930	45.2	44.6	89.8
1931	33.5	46.1	79.6
1932	22.9	43.3	66.2
1933	25.4	64.2	89.6
1934	27.0	85.2	112.2
1935	42.7	116.5	159.2
1936	35.8	139.9	175.7
1937	20.6	156.6	177.2

Accident Rates, Chemical Industry, 1937, p. 1

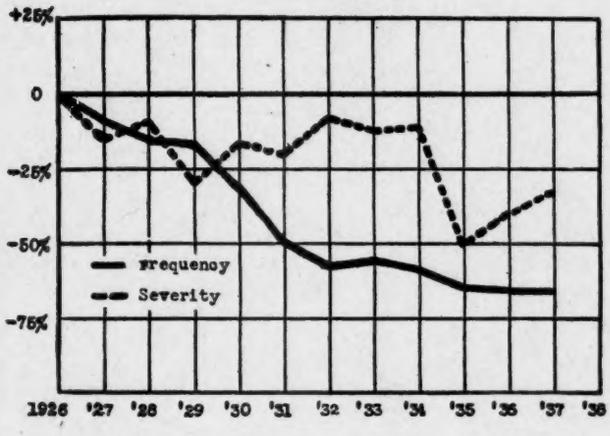
The yearly report of the National Safety Council on the accident record of the chemical industry indicates that the '37 injury rates were 10.23 for frequency and 1.29 for severity, based on reports from 323 plants which worked 302,704,000 man-hours during the year. These rates compare favorably with corresponding averages of 13.85 and 1.58 for all industries. The industry ranked 9th in frequency and 16th in severity in a list of 30 major industries.

Frequency rates averaged 3% below '36, but severity rates were 14% higher. For all industries there was no change in frequency, while severity decreased 2%.

Since '26, chemical plants have reduced frequency 67% and severity 32%. The improvement in frequency exceeds the progress made by all industries, but the reduction in severity is 10% less.

Large plants had the lowest frequency rates, averaging 9.65, and the middle-sized units had the lowest severity rates, averaging 0.45. Small plants, however, made the largest reduction in frequency from '36, averaging 20%; middle-sized units had the largest decrease in severity, 47%. Manufacturers of carbon products again had the lowest frequency rate, averaging 4.69. Manufacturers of alcohol and solvents again had the lowest severity rate, 0.14.

Percentage Changes in Accident Rates, Chemical Industry*



Manufacturers of paint and varnish made the largest reduction in frequency from '36, 18%; the largest improvement in severity, 62%, was made by manufacturers of vegetable oils.

Reports covering 190 fatalities and permanent partial disabilities occurring during the past 4 years show that the principal mechanical causes of such injuries were "hazardous arrangement" and "improper guarding." The most important personal cause was "wrong attitude."

The most important types of compensable accidents in the chemical industry, according to state reports, are "handling objects" and "harmful substances," which account for 40% of all types.

The du Pont plant at Old Hickory, Tenn., holds the best known all-time no-injury record in the industry, 11,361,846 man-hours. This is also the best record in any industry.

As in previous years, both injury rates were below the average for all industries. Frequency is 26% and severity is 18% below the all-industries averages. The frequency standing of chemical plants among 30 major industries improved from 11th place in '36 to 9th place in '37. But in severity the industry ranked 16th in '37 compared with 14th in '36.

Chemical plants have made marked progress in reducing frequency rates during the past 11 years. Their reduction exceeds the average improvement for all industries by 6%. In severity, however, progress has been less rapid than in many industries. The average reduction by all industries is 10% larger than the improvement made in the chemical industry.

Industry	Frequency Changes 1936 to 1937	Frequency Changes 1926 to 1937	Severity Changes 1936 to 1937	Severity Changes 1926 to 1937
CHEMICAL	—3%	—67%	+14%	—32%
All Industries	+0%	—61%	— 2%	—42%
Textile	+2%	—55%	+15%	+24%
Tanning & Leather	+9%	—52%	+50%	+50%
Paper & Pulp	+6%	—62%	+54%	—40%
Non-Ferrous Metals	+4%	—54%	+63%	+ 7%

Experience by Type of Injury

An analysis of the industry's 1936-1937 experience by type of injury partially explains why frequency went down and severity rose. The frequency improvement was only in temporary disabilities. Fatalities increased 40% and permanent partial disabilities were up 11%. Permanent partial disabilities decreased 15% in severity and the severity of temporary disabilities also declined, but these gains were more than offset by the sharp rise in deaths.

	All Injuries	Death and Perm. Total	Perm. Partial	Temporary
1937 Frequency Rate	10.23	.13	.61	9.49
1937 Severity Rate	1.29	.78	.36	.15
Change in Frequency 1936 to 1937	— 3%	+40%	+11%	— 4%
Change in Severity 1936 to 1937	+14%	+40%	—15%	—12%
Change in Frequency 1926 to 1937	—67%	—16%	—36%	—69%
Change in Severity 1926 to 1937	—32%	—16%	—48%	—63%

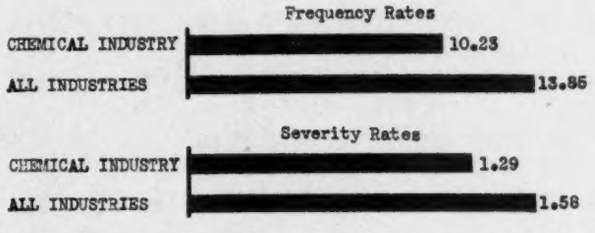
Experience in Plants of Different Sizes

Frequency rates among plants of various sizes ranged upward from 9.65 in large units to 16.28 in the small plants. Severity rates also were highest in the smallest units, averaging 1.72.

Small plants, on the other hand, made an improvement in both injury rates from 1936 to 1937 by reducing frequency 20% and severity 26%.

Size Group	1937 Frequency Rate	1937 Severity Rate	1936-1937 Change in Frequency	1936-1937 Change in Severity
Large	9.65	1.31	— 1%	+21%
Middle-sized*	13.04	.45	+10%	—47%
Small	16.28	1.72	—20%	—26%

* Covers Pharmaceutical and Fine Chemical Manufacturing, Soap Plants, and Not Otherwise Classified.



Experience in Various Types of Plants

In the various branches of the industry, frequency rates ranged from 4.69 for carbon products manufacturers to 25.43 for fertilizer plants. There were wide differences also in severity rates, which ranged from 0.14 for alcohol and solvents manufacturing to 3.67 for coal tar distillers.

The largest reduction in frequency from 1936 to 1937 was made by paint and varnish manufacturing plants, 18%, and the largest improvement in severity occurred in vegetable oil manu-

Accident Rates, Chemical Industry, 1937, p. 1

Accident Rates, Chemical Industry, 1937, p. 2

Disabling Injuries, 1937, Chemical Industry, by Industrial Groups

Industrial Group	No. of Industrial Units	Man-Hours Worked (Thousands)	Average Number of Employees	No. Disabling Injuries: Total Death and Perm.	Perm. Partial	Temporary	Total	Number of Days Charged: Death and Perm. Total	Perm. Partial	Temporary	Total	Injury Rates: Frequency	Severity
ALL GROUPS	323	302,704	146,631	39	186	2,871	3,096	234,000	109,865	47,203	391,068	10.23	1.29
Carbon Products	13	10,655	5,300	1	6	43	50	6,000	3,875	709	10,584	4.69	.99
Plastics Manufacturing	10	14,706	7,043	1	13	59	73	6,000	6,045	899	12,944	4.96	.88
Explosives Manufacturing	28	18,289	8,944	7	4	84	95	42,000	2,366	1,434	45,800	5.19	2.50
Acid Manufacturing	20	18,090	8,659	3	14	115	132	18,000	7,182	2,139	27,321	7.30	1.51
Paint & Varnish Manufacturing	24	22,783	10,941	3	6	160	169	18,000	10,000	3,803	31,803	7.41	1.40
Dye Manufacturing	6	12,880	6,310	2	8	87	97	12,000	6,330	1,426	19,756	7.53	1.53
Chlorine & Alkali Manufacturing	12	13,021	5,995	2	5	125	132	12,000	2,385	2,201	16,586	10.14	1.27
Alcohol & Solvents Mfg.	6	2,112	1,005	0	0	22	22	0	0	301	301	10.42	.14
Soap Manufacturing	34	29,569	14,812	3	40	310	353	18,000	18,215	5,307	41,522	11.94	1.40
Pharmaceutical and Fine Chemical Manufacturing	31	34,880	16,932	1	11	461	473	6,000	11,709	5,514	23,223	13.56	.67
Salt Manufacturing	12	4,492	2,100	1	4	78	83	6,000	396	1,354	7,750	18.48	1.72
Coal Tar Distillers	18	1,907	918	1	1	36	38	6,000	300	692	6,992	19.93	3.67
Vegetable Oil Manufacturing	28	7,638	3,635	1	14	138	153	6,000	3,675	2,329	12,004	20.03	1.57
Fertilizer Manufacturing	10	9,201	4,077	4	6	224	234	24,000	4,829	4,854	33,683	25.43	3.66
Not Otherwise Classified	71	102,481	49,950	9	54	929	992	54,000	32,558	14,241	100,799	9.68	.98

facturing, 62%. In comparison, sharp increases in frequency occurred in plants manufacturing carbon products and acids. Severity rates rose materially in salt manufacturing, and paint and varnish plants.

Industrial Group	1936-1937 Change in Frequency	1936-1937 Change in Severity
ENTIRE INDUSTRY	— 3%	+ 14%
Paint and Varnish Mfg.	—18%	+113%
Chlorine & Alkali Mfg.	—16%	+ 13%
Explosives Mfg.	— 8%	+ 75%
Soap Manufacturing	— 8%	+ 79%
Salt Manufacturing	— 8%	+477%
Not Otherwise Classified	— 5%	+ 36%
Pharmaceutical & Fine Chemical Mfg.	— 4%	— 5%
Dye Manufacturing	— 3%	+ 72%
Coal Tar Distillers	+ 0%	+ 76%
Fertilizer Manufacturing	+ 1%	— 35%
Alcohol & Solvents Mfg.	+ 2%	+ 75%
Vegetable Oil Mfg.	+ 4%	— 62%
Plastics Manufacturing	+10%	— 39%
Acid Manufacturing	+27%	— 30%
Carbon Products	+41%	— 7%

Causes of Serious Injuries

1. *Agencies of Injury.* Machinery, as in most industries, was the principal agency of injury, being involved in over one-third of all serious cases. Of the various types, presses were most important. Pumps, fans, mixers, and rolls were also mentioned frequently.

Working surfaces, such as platforms, ladders and floors, were next in importance. Other agencies were chemicals, elevators and hoisting apparatus, boilers, and pipe and pressure apparatus.

2. *Mechanical Causes of Serious Injuries.* "Hazardous arrangement" was assigned to 40% of all serious injuries and was the principal mechanical cause of the accidents. Unsafe planning of work and unsafe methods and processes were the items most frequently mentioned.

Improper guarding figured in 22% of all cases. Defective agencies, such as poorly designed or constructed equipment and broken or worn parts of machinery, were assigned to 20% of all cases.

Of other mechanical causes, unsafe dress or apparel was most important. Goggles, in some cases, were either not provided or not worn and as a result, several employees suffered loss of sight.

3. *Personal Causes of Serious Injuries.* About 55% of all serious accidents were partly due to wrong attitudes on the part of employees. Disregarding instructions was most often mentioned. Inexperience and unawareness of safe practices was the next important personal cause of serious injuries.

Types of Accidents

Following table gives a percentage distribution of the cases (nearly all compensable) covered in recent one-year reports from Illinois, N. Y., Maryland, N. J. and Pennsylvania. These reports covered 224,661 injuries in all industries and 3,022 injuries in the manufacture of chemicals.

Type of Accident	Per cent. in All Industries	Per cent. in Chemical Industry
All Types	100.0	100.0
Handling Objects	25.9	26.1
Falls to a different level	8.7	10.3
Falls to the same level	9.5	8.1
Machinery	12.0	11.3
Vehicles	10.9	6.0
Using hand tools	7.6	4.7
Falling objects	8.7	4.3
Stepping on or striking against objects	5.6	4.5
Electricity, explosives, heat	3.6	7.1
Harmful substances	2.1	13.5
Other	5.4	4.1

Naval Stores, 1936-37

Production, Distribution, Consumption, Stocks—p. 1

Details of Carryover (Stocks) March 31

	TURPENTINE				ROSIN			
	1938		1937	1936	1938		1937	1936
	Gum	Wood	Gum & wood	Gum & wood	Gum	Wood	Gum & wood	Gum & wood
Gum stills[1]	24,397	....	11,272	8,032	211,545	....	50,847	73,411
Savannah[2]	27,073	....	23,728	37,488	67,039	....	43,633	57,626
Jacksonville[2]	6,593	....	37,692	45,880	57,656	....	47,299	56,986
Pensacola[2]	22,635	....	14,980	31,421	13,661	....	18,001	41,769
Other Sou. Ports	34,416	....	32,297	28,160	61,689	....	72,436	88,459
Interior yards	20,479	....	13,918	14,801	10,545	....	33,364	36,281
Total	111,196	....	122,615	157,750	210,590	....	214,733	281,121
Wood plants:								
Steam dist.[3]	....	....	17,579	21,943	10,144	....	162,572	47,059	69,110
Sulfate	....	....	5,759	3,499	1,395	....	4,400	....	....
Destructive dist.	....	....	650	643	1,157	....	....	....	....
Total	....	....	23,988	26,085	12,696	....	166,972	47,059	69,110
Distributing points:								
Eastern	4,370	3,978	9,760	10,116	3,808	8,307	11,341	10,803
Central	17,795	9,107	19,201	16,324	9,104	5,132	8,429	11,564
Western	5,718	1,770	3,642	4,964	729	4,803	1,179	1,116
Total[4]	27,883	14,855	32,603	31,404	13,641	18,242	20,949	23,483
Industrial plants[5]	10,730	5,725	30,789	20,254	329,804	48,553	329,663	318,682

Summary of Carryover (Stocks)

Gum stills	24,397	....	11,272	8,032	211,545	....	50,847	73,411
Sou. ports and int. yards	111,196	....	122,615	157,750	210,590	....	214,733	281,121
Wood plants	....	....	23,988	26,085	12,696	....	166,972	47,059	69,110
No. dist. points	27,883	14,855	32,603	31,404	13,641	18,242	20,949	23,483
Industrial plants	10,730	5,725	30,789	20,254	329,804	48,553	329,663	318,682
Total in U. S.	174,206	44,568	223,364	230,136	765,580	233,767	663,251	765,807
At and afloat to London	30,715		21,300	9,516				
Total U. S. and London	249,489		244,664	239,652				

[1] Compiled from reports by producers and factors. [2] Official Board of Trade and Chamber of Commerce reports. [3] Does not include by-products resulting from making pale grades from FF wood rosin. [4] Compiled from reports of individual distributors. [5] Compiled from reports of individual consumers. [9] April 5, 1937, and April 4, 1938. Gum and Wood. Included because of the importance of its affect on the American market.

U. S. Exports of Turpentine

(By naval stores seasons beginning April 1 and ending the following March 31)

TOTAL EXPORTS OF TURPENTINE

Destination	1937-38	1936-37	1935-36
	(Bbls.—50 gals.)		
United Kingdom	129,168	134,831	110,544
Germany and No. Europe	70,774	59,638	59,624
Italy and So. Europe	7,977	15,717	2,682
Argentine	4,807	3,743	3,482
Brazil	2,644	2,408	2,095
Other So. America	4,438	4,217	3,564
Japan	1,163	1,125	895
Australia and New Zealand	18,400	17,814	15,152
Netherlands East Indies	126	22	109
Canada	27,132	23,625	19,415
All Other Exports	9,901	8,213	6,821
Totals	276,530	271,353	224,383

EXPORTS, GUM SPIRITS OF TURPENTINE

United Kingdom	118,106	121,987	101,489
Germany and No. Europe	57,023	52,634	55,730
Italy and So. Europe	900	9,758	2,210
Argentine	4,467	3,368	3,100
Brazil	2,246	2,003	1,708
Other So. America	3,703	3,823	3,196
Japan	866	671	699
Australia and New Zealand	16,074	15,000	14,467
Netherlands East Indies	121	18	101
Canada	23,068	21,835	17,037
All Other Exports	7,027	6,778	5,346
Totals	233,601	237,875	205,084

Statistics given on these two pages are taken from the annual report of the Bureau of Chemistry and Soils, U. S. Dept. of Agriculture, compiled by F. P. Veitch and C. F. Speh, Naval Stores Research Division.

Reported Consumption of Turpentine and Rosin in United States

(Combined Gum and Wood Products)

	TURPENTINE			ROSIN		
	1937-38	1936-37	1935-36	1937-38	1936-37	1935-36
		(Bbls.—50 gals.)			(Bbls.—500 lbs. gross)	
Abattoirs	0	0	0	1,635	4,170	2,375
Adhesives and plastics	638	628	749	17,596	18,002	26,662
Asphaltic products	0	2	8	1,060	1,723	1,808
Automobiles and wagons	544	662	890	603	3,541	2,855
Chemicals and pharmaceuticals	31,275	21,583[1]	1,346	119,246	118,404[1]	3,370
Ester gum and synthetic resins	0	0	13	111,812	101,891	98,758
Foundries and foundry supplies	759	1,085	326	15,227	16,860	11,218
Furniture	559	592	843	37	31	123
Insecticides and disinfectants	526	471	600	4,060	4,194	5,357
Linoleum and floor covering	67	72	39	27,482	34,775	24,650
Matches	0	0	0	2,126	2,966	2,869
Oils and greases	45	45	225	24,498	31,471	34,345
Paint, varnish and lacquer	55,985	61,528	66,538	136,897	140,043	147,245
Paper and paper size	0	0	0	340,200	410,775	357,143
Printing ink	271	212	200	12,763	15,936	15,112
Railroads and shipyards	4,421	5,102	3,875	290	209	242
Rubber	138	168	1,114	2,722	2,926	2,544
Shoe polish and shoe materials	10,726	11,267	10,234	8,176	8,746	9,871
Soap	9	181	125	272,820	297,073	278,750
Other industries	1,636	1,812	803	4,397	4,972	2,284
Total Industrial Reported	107,599	105,410	87,928	1,103,647	1,218,708	1,027,581
Not Accounted for[3]	335,127	280,458	264,310	88,087	118,790	259,832
Apparent U. S. Consumption	442,726	385,868	352,238	1,191,734	1,337,498	1,287,413

[1] Includes for the first time turpentine and rosin consumed in producers' plants in the production of unclassified derived products.
[2] Compiled from reports by individual consumers for the calendar years 1935 and 1936; 1937-38 figures are for the naval stores season. Since industrial consumption is fairly uniform throughout the year in most industries, no material error is involved in using these figures on the naval stores season basis. They will affect only the "Not Accounted for."
[3] Principally unreported distribution of turpentine through retailers who sell in small quantities to ultimate consumers, and of rosin for unreported industrial consumption; also for distribution through retailers who sell in small quantities to ultimate consumers.

Naval Stores, 1936-37

Production, Distribution, Consumption, Stocks—p. 2

U. S. Exports of Turpentine (Cont'd)

(By naval stores seasons beginning April 1 and ending the following March 31)

EXPORTS, WOOD TURPENTINE

United Kingdom	11,062	12,844	9,055
Germany and No. Europe	13,751	7,004	3,894
Italy and So. Europe	7,077	5,959	472
Argentine	340	375	382
Brazil	398	405	387
Other So. America	735	394	368
Japan	297	454	196
Australia and New Zealand	2,326	2,814	685
Netherlands East Indies	5	4	8
Canada	4,064	1,790	2,378
All Other Exports	2,874	1,435	1,474
Totals	42,929	33,478	19,299

(Source of information—Bureau of Foreign and Domestic Commerce.)

TOTAL EXPORTS OF ROSIN

Destination	1937-38	1936-37	1935-36
	(Bbls.—599 lbs. gross)		
United Kingdom	274,006	243,392	273,388
Germany and No. Europe	279,197	331,268	391,023
Italy and So. Europe	26,338	49,555	60,552
Argentine	67,684	68,101	68,525
Brazil	68,393	43,329	65,510
Other South America	37,804	30,887	34,283
Japan	86,097	124,742	123,316
Australia and New Zealand	30,596	29,260	36,404
Netherlands East Indies	38,093	53,556	39,396
Canada	66,655	59,135	54,747
All Other Exports	59,609	66,213	57,293
Totals	1,034,472	1,099,438	1,204,437

EXPORTS OF GUM ROSIN

United Kingdom	188,091	166,175	208,340
Germany and No. Europe	183,183	204,223	263,392
Italy and So. Europe	15,900	41,709	57,744
Argentine	50,047	46,467	51,286
Brazil	54,220	35,345	55,461
Other South America	27,947	26,109	30,758
Japan	77,561	107,511	116,676
Australia and New Zealand	26,976	21,341	34,043
Netherlands East Indies	25,785	34,981	23,777
Canada	49,188	44,013	37,918
All Other Exports	41,475	58,282	46,045
Totals	740,373	786,156	925,440

EXPORTS OF WOOD ROSIN

United Kingdom	85,915	77,217	65,048
Germany and No. Europe	96,014	127,045	127,631
Italy and So. Europe	10,438	7,846	2,808
Argentine	17,637	21,634	17,239
Brazil	14,173	7,984	10,049
Other South America	9,857	4,778	3,525
Japan	8,536	17,231	6,640
Australia and New Zealand	3,620	7,919	2,361
Netherlands East Indies	12,308	18,575	15,619
Canada	17,467	15,122	16,829
All Other Exports	18,134	7,931	11,248
Totals	294,099	313,282	278,997

(Source of information—Bureau of Foreign and Domestic Commerce.)

Gum Turpentine Production

(Percentage by States)

States	Per cent. 1937-38	1936-37	1935-36
North Carolina	.15	.14	.19
South Carolina	2.90	3.01	3.36
Georgia	57.06	57.29	55.42
Florida	26.39	25.81	28.46
Alabama	9.65	10.58	9.19
Mississippi	3.08	2.30	2.02
Louisiana	.40	.48	.95
Texas	.37	.39	.41
Totals	100.00	100.00	100.00

Details of Production

(By naval stores seasons beginning April 1 and ending the following March 31)

	TURPENTINE			ROSIN		
	1937-38	1936-37	1935-36	1937-38	1936-37	1935-36
	(Bbls.—50 gals.)			(Bbls.—500 lbs. gross)		
Gum	518,454	482,787	497,000	1,709,157	1,565,240	1,647,000
Reclaimed Gum	.....	.....	.....	26,271	42,694	54,187
Steam Dist. Wood	136,292	122,388	88,875	803,538	724,028	575,304
Sulfate Wood	38,500	22,635[1]	11,712	23,000[2]	.....[3]	.....[3]
Dest. Dist. Wood	7,085	6,710	5,321	.....	.....	.....
Totals	700,331	634,520	602,908	2,561,966	2,331,962	2,276,491
GUM PRODUCTION BY STATES[4]						
North Carolina	785	682	956	2,856	2,260	3,259
South Carolina	15,044	14,570	16,697	52,067	45,040	53,716
Georgia	295,809	276,681	275,450	982,086	894,898	909,407
Florida	136,846	124,585	141,416	436,366	409,705	466,929
Alabama	50,030	51,077	45,637	168,362	164,705	160,450
Mississippi	15,973	11,080	10,045	54,638	36,103	32,271
Louisiana	2,065	2,245	4,733	7,076	6,581	15,311
Texas	1,902	1,867	2,066	5,706	5,948	5,657
Totals	518,454	482,787	497,000	1,709,157	1,565,240	1,647,000

[1] Production figures for 1936-37 include estimate for one producer. [2] Compiled from a reported total production of approximately 10,800 tons of liquid rosin. [3] Information not available. [4] Does not include reclaimed rosin.

Summary of Supply, Distribution and Carryover of Turpentine and Rosin

(By naval stores seasons beginning April 1 and ending the following March 31)

	TURPENTINE			ROSIN		
	1937-38	1936-37	1935-36	1937-38	1936-37	1935-36
	(Bbls.—50 gals.)			(Bbls.—500 lbs. gross)		
SUPPLY AND DISTRIBUTION						
Carryover April 1	223,364	230,136	191,359	663,251	765,807	978,930
Production	700,331	634,520	602,908	2,561,966	2,331,962	2,276,491
Imports	14,335	15,929	12,490	336	2,418	2,236
Available Supply	938,030	880,585	806,757	3,225,553	3,100,187	3,257,657
Less Carryover March 31	218,774	223,364	230,136	999,347	663,251	765,807
Apparent Total Consumption	719,256	657,221	576,621	2,226,206	2,436,936	2,491,850
Less Exports	276,530	271,353	224,383	1,034,472	1,099,438	1,204,437
Apparent U. S. Consumption	442,726	385,868	352,238	1,191,734	1,337,498	1,287,413
PRODUCTION AND IMPORTS						
Gum	518,454	482,787	497,000	1,735,428[5]	1,607,934[5]	1,701,187[5]
Wood	181,877	151,733	105,908	826,538	724,028	575,304
Imports	14,335	15,929	12,490	336	2,418	2,236
Totals	714,666	650,449	615,398	2,562,302	2,334,380	2,278,727
CARRYOVER (Stocks)						
Carryover April 1	223,364	230,136	191,359	663,251	765,807	978,930
Carryover March 31 (12 months later)	218,774	223,364	230,136	999,347	663,251	765,807
Increase	.....	.....	38,777	336,096	.....	.....
Decrease	4,590	6,772	.....	.....	102,556	213,123

[5] Includes reclaimed rosin.

U. S. Chemical Patents

Off. Gaz.—Vol. 490, Nos. 4, 5—491, Nos. 1, 2, 3—p. 35

Cellulose

Purification crude cellulose ether; treating same in a solvent with an aliphatic carboxylic acid and a mineral acid. No. 2,118,663. Russell R. Bradshaw to Dow Chemical Co., both of Midland, Mich.

Purification crude cellulose ether; mixing same in a non-aqueous solvent with an aliphatic carboxylic acid. No. 2,118,664. Russell R. Bradshaw to Dow Chemical Co., both of Midland, Mich.

Method displacing water from wet, loose cellulose and pretreating same. No. 2,119,117. Aladar Schuller, Antwerp, and Remi-Gustaaf Tritsmans, Mortsel, near Antwerp, Belgium, to Gevaert Photo Producten, N. V., Antwerp, Belgium.

Bleaching cellulose; subjecting same to action of a titanium compound in which titanium has valence of less than 4, in presence of an oxidizing bleaching agent and water while maintaining an alkaline pH. No. 2,119,519. Alfred O. Bragg, Jersey City, N. J., to Kuehne Chem. Co., Elizabeth, N. J.

Method enhancing colorability of natural and regenerated cellulose; treating fiber with salts of bases of the pyridine type with strong acids in presence of inert diluting agents. No. 2,120,267. Erik Schirm, Dessau, Germany, to I. G., Frankfort-am-Main, Germany.

Preparation cellulose xanthate solution. No. 2,120,147. Geo. A. Richter to Brown Co., both of Berlin, N. H.

Production cellulose derivatives containing nitrogen; subjecting cellulosic material in presence of an aqueous alkaline liquid to action of epichlorhydrin and a compound from the group of ammonia and ammonia derivatives. No. 2,120,513. Richard Stahn, Dessau, Germany, to I. G., Frankfort-am-Main, Germany.

Method bleaching and purifying cellulosic material; subjecting same to action of chlorine, then to action of mixture of a chlorite and a hypochlorite. No. 2,120,678. John L. Parsons and Donald T. Jackson, to Hammermill Paper Co., all of Erie, Pa.

Chemical Specialty

Liquid wax polishing composition, composed of a wax, a readily volatile solvent, and an acid phthalate alkyl ester, the alkyl group having more than 4 carbon atoms. No. 2,118,521. John D. Pickens, Flint, Mich., to du Pont, Wilmington, Del.

Welding flux comprising boron oxide, zinc oxide, and alkali metal halide. No. 2,118,680. Arthur R. Lytle, Niagara Falls, N. Y., to Oxweld Acetylene Co., corp. of W. Va.

Production individual transfer designs on surface of a liquid carrier bath by use of coloring material. No. 2,118,781. Velmont Sallada, Annandale, N. J.

Painting composition comprised of a chlorinated organic compound, a solvent of the chlorinated material, a salt, pigment, and filler. No. 2,118,787. Edwin C. Clayton and Lawrence L. Heffner to Wm. E. Hooper & Sons Co., all of Balto., Md.

Refractory mixture having molded body composed of silicon carbide grains, bentonite, Goulac, and ferric oxide. No. 2,118,789. Henry C. Fisher to Norton Co., both of Worcester, Mass.

Porous refractory of high refractory qualities; using graded sizes of pure fused alumina, mixing them together with an alumina of microcrystalline structure, then adding bentonite. No. 2,118,798. Chas. W. Saxe to Norton Co., both of Worcester, Mass.

Production paint solutions from rubber, using carbon disulfide in process. No. 20,742. Reissue. Edw. Orland Coats, Warrensburg, Mo., one-half to Henry Bishop Stratton; five-twentieths to Cleo Rucker; and five-twentieths to Irene Coats, all of Warrensburg, Mo.

Method performing successive pickling operations on iron and steel articles in a bath and conserving sulfuric acid pickling liquor used therein. No. 2,118,802. Hans Barkholt, Berlin-Halensee, Germany, to Zahn & Co., G. m. b. H., Berlin, Germany.

Roofing material comprising granules having protective silica coating thereon. No. 2,118,898. Forest W. Price to Pacific Minerals Co., Ltd., both of Richmond, Calif.

Clear, transparent, colorless liquid for cleaning, softening and polishing tan or black leather shoes or other leather products; comprising supernatant liquid from mixture of lemon juice, oil of wintergreen and benzine. No. 2,118,932. Vincent Paul Lo Bianco, N. Y. City.

Planograph printing plate, having an aluminum printing face on which a greasy image is applied; said face being provided with a thin adherent film of electrolytically produced anodic oxide of aluminum. No. 2,119,031. Wm. B. Wescott, Dover, Mass., to Addressograph-Multigraph Corp., Cleveland, O.

Insecticide or fungicide containing amorphous sulfur. No. 2,119,125. Myron Vernon Anthony, New Haven, Conn., to Stauffer Chem. Co., N. Y. City.

Buffing composition containing an abrasive, a waxy binder, petrolatum, and an organic amine salt of a sulfated higher aliphatic alcohol. No. 2,119,159. Clifford V. Glenning, Watertown, Conn., to du Pont, Wilmington, Del.

Roll of adhesive strip; a strip of cellulose derivative sensitive to moisture, coated with plastic adhesive material. No. 2,119,163. Otto Herrmann, Wiesbaden, and Philipp Muller, Wiesbaden-Sonneberg, Germany, to Kalle & Co., Aktiengesellschaft, Wiesbaden-Biebrich, Germany.

Sealing material for tin cans, etc.; a water suspension of particles including polymerized chloro-2-butadiene-1, 3 jellified drying oil, alkyd resin and ester gum. No. 2,119,280. Alfred L. Kronquest and Samuel C. Robinson, Syracuse, N. Y., to Continental Can Co., N. Y. City.

Method forming fluorescent screen; applying to supporting surface a fluorescent material in form of small particles suspended in a liquid. No. 2,119,309. John C. Batchelor, N. Y. City.

Electrically insulating band consisting of an intimate association of textile material and an insulating mass comprising polymerized acrylic acid derivative containing a filling material having the thermal conductivity properties of quartz. No. 2,119,400. Paul Nowak, Berlin-Charlottenberg, Germany, to General Electric Co., corp. of N. Y.

Belt dressing for machinery or like; adding sharply grated hardest grade sole leather to an ammoniacal treating agent, then adding latex, finally adding further quantity of the leather. No. 2,119,457. Henry Vincent Dyke, Auckland, New Zealand.

Protection wool, furs, floor coverings, etc., against attack by insects and their larvae; by treatment with an aqueous solution of calcium selenate, then treating material with an aqueous solution of an alkaline-earth fluoride. No. 2,119,458. Dalton B. Faloon, Beacon, and Roland M. Whitaker, N. Y. City, to Hammond Paint & Chem. Co., Beacon, N. Y.

Manufacture urea and formaldehyde varnishes. No. 2,119,466. Paul Michaut, Paris, France.

Anti-freeze solution comprising a monohydric water-soluble alcohol, para-cymene, and alpha ethyl beta propyl acrolein. No. 2,119,506. Cecil E. Watts to Commercial Solvents Corp., both of Terre Haute, Ind.

Anti-rust composition containing a condensation product of an aromatic hydrocarbon and a high melting point wax fraction having a chlorine content ranging from 2 to about 6%. No. 2,119,522. Lawrence C. Brunstrum, Chicago, and Frederick H. MacLaren, Calumet City, Ill., to Standard Oil Company, Chicago, Ill.

Bleaching and washing agents; reacting a higher molecular alcohol compound having at least 6 carbon atoms with a pyrophosphating agent and a peroxide bleaching agent. No. 2,119,523. Karl Butz to H. Th. Bohme Aktiengesellschaft, both of Chemnitz, Germany.

Method printing on a transparent glass container; involving use of a quick-drying, hard-setting ink, covering ink with a synthetic-resin varnish, then heating bottle. No. 2,119,546. Donald W. Knaggs, City Island, N. Y., to Anigraphic Process, Inc., N. Y. City.

Anti-rust material and plug valve lubricant; fuming sulfuric acid treated condensation product of chlorinated wax and an aromatic hydrocarbon and an acid-resistant mineral oil. No. 2,119,552. Frederick H. MacLaren, Calumet City, and Lawrence C. Brunstrum, Chicago, Ill., to Standard Oil Co., Chicago, Ill.

Anti-rust material; improved slushing composition containing mahogany soap and a sulfuric acid treated condensation product of chlorinated wax and an aromatic hydrocarbon. No. 2,119,553. Frederick H. MacLaren, Calumet City, and Lawrence C. Brunstrum, Chicago, Ill., to Standard Oil Co., Chicago, Ill.

Lubricating oil having pour point of 5°F. or below; mixture of a partially dewaxed paraffin base lubricating oil with a pour point depressant. No. 2,119,718. Ernest F. Pevere, Beacon, N. Y., to Texas Co., N. Y. City.

Stabilized metallic siccative soap solution; comprising a metallic siccative soap, an organic solvent, and an aliphatic monohydric alcohol. No. 2,119,753. John T. Rutherford, Berkeley and Glenn C. Brock, El Cerrito, Calif., to Standard Oil Co. of Calif., San Francisco, Calif.

Composite floor having a layer of non-drying plastic mastic incorporated therein. No. 2,119,804. Kenneth E. Crooks, Williamsport, Pa.

Process and apparatus for exterminating pests in articles. No. 2,119,837. Theodor Wehrle, Basel, Switzerland, to Deutsche Gesellschaft fur Schadlingsbekampfung m. b. H., Frankfort-am-Main, Germany.

Method bodying a drying varnish oil; using carbon dioxide in process. No. 2,120,044. Julius L. Schneider, Sylvester Leon Flugge, and Raymond J. Evans, Chicago, Ill., to Continental Can Co., N. Y. City.

Thermoplastic adhesive for use in uniting fabrics, comprising a polymerized derivative of methacrylic acid, dibutyl phthalate, and chlorinated rubber. No. 2,120,054. Ralph M. Freydberg, N. Y. City, to Acme Backing Corp., Brooklyn, N. Y.

Radiator cleaning composition; a preformed concentrated emulsion of water in kerosene containing sodium metasilicate and the sodium soap of acids of oxidized paraffin wax. No. 2,120,128. Benj. Gallsworthy, Glenham, N. Y., to Texas Co., N. Y. City.

Fumigant carrier combination. No. 2,120,204. Harry J. Langhorst, Larchmont, N. Y., to American Cyanamid & Chem. Corp., N. Y. City.

Liquid nicotine composition comprising anhydrous nicotine and water-free liquid petroleum hydrocarbon. No. 2,120,225. Robt. B. Arnold, Stonewall Courts, Va., to Tobacco By-Products & Chem. Corp., Louisville, Ky.

Lacquer which upon drying gives a film that is proof against discoloration by actinic rays, in which all carbohydrate derivatives present are nitrostarch, having viscosity from 4 to 6 centipoises and nitrogen content of 11.5% to 12.5%. No. 2,120,236. Walter Durgin Bowlby, Jersey City, N. J., to Egyptian Lacquer Mfg. Co., corp. of N. J.

Spark plug insulator made of recrystallized alumina together with crystalline aluminate. No. 2,120,338. Taine G. MacDougal, Albra H. Fessler, and Karl Schwartzwalder, Flint, Mich., to General Motors Corp., Detroit, Mich.

Formation cement-fibrous composition. No. 2,120,268. Chas. H. Schuh, Ridgewood, N. Y., to Bakelite Building Products Co., N. Y. City.

Manufacture asphalts. No. 2,120,376. Vladimir L. Shipp, N. Y. City, and Arthur H. Boenau, Long Island City, N. Y., to Socony-Vacuum Oil Co., N. Y. City.

Manufacture asphalts. No. 2,120,377. Vladimir L. Shipp and James W. Ramsay, N. Y. City, and Arthur H. Boenau, Sunnyside, N. Y., to Socony-Vacuum Oil Co., N. Y. City.

Printing ink containing heat-liquefied rubber. No. 2,120,393. Richard A. Crawford, Akron, O., to B. F. Goodrich Co., N. Y. City.

Thermal insulating compound; made by contacting granules of diatomaceous earth and a binder, bonding together, then embodying product of the reaction of a mild silica flux and diatomaceous earth. No. 2,120,431. Wm. L. Stafford, Plainfield, N. J., to Johns-Manville Corp., N. Y. City.

Fabric covering for vehicle tops; cotton base fabric coated and impregnated with latex vulcanized therein; fabric being elastic and capable of local stretching and distortion to conform to curvature of vehicles. No. 2,120,434. Edwin C. Clayton to Wm. E. Hooper & Sons Co., both of Balto., Md.

Plastic finishing or lapping compound; made from carbon, manganese dioxide, woodgum resin, and a hydrocarbon binder. No. 2,120,442. Alex. Lindenberg, Selkirk, Man., Canada.

Production expanded concrete from concrete mixture having added thereto aluminum flakes, including a flake separating substance and a solvent for latter, solvent characterized by its ability to retard setting of the concrete. No. 2,120,468. Noak Victor Hybinette, Jackson, Mich.

Refrigerant mixture for absorption refrigerators; comprising a hydrogenated naphthalene as solvent and a volatile chemically stable refrigerant stable in said solvent. No. 2,120,559. Burgess H. Jennings, Bethlehem, Pa., to Phila. and Reading Coal & Iron Co., Phila., Pa.

Composite metallic body comprising core of high electrical heat and heat conductivity and a covering of a metallic material non-corrosive under normal conditions of oxidation and hydration. No. 2,120,561. Clemens A. Laise, Tenafly, N. J., and Jacob Kurtz, Brooklyn, N. Y., to Eisler Electric Corp., Union City, N. J.

Manufacture refractory material. No. 2,120,562. Clemens A. Laise, Tenafly, N. J., to Eisler Electric Corp., Union City, N. J.

Golf ball cover composed entirely of admixture of at least one rubber-like material and a thermoplastic rubber derivative with a Shore hardness in the eighties. No. 2,120,567. Jas. A. Merrill, Akron, O., to Wingfoot Corp., Wilmington, Del.

Manufacture printing inks from pulp pigments; treating water wet filter press cake pulp, containing water, with a wetting agent, finally stably emulsifying water coated pigment in an oily ink vehicle. No. 2,120,588. Jos. G. Curado, Jackson Heights, L. I., N. Y., to General Printing Ink Corp., N. Y. City.

U. S. Chemical Patents
Off. Gaz.—Vol. 490, Nos. 4, 5—491, Nos. 1, 2, 3—p. 35

U. S. Chemical Patents

Off. Gaz.—Vol. 490, Nos. 4, 5—491, Nos. 1, 2, 3—p. 36

Lubricating fluid; emulsion consisting of mixture of a fully formed soap, water, kerosene and citronella oils; emulsion being characterized in that it remains thin and free-flowing under all conditions and does not gum. No. 2,120,616. Wm. G. Klitzke, Portland, Ore.

Tip for a soldering iron and the like; comprising a copper core, and a jacket made of nickel, iron, chromium, manganese, silicon, and carbon. No. 2,120,708. Irving C. Matthews, Rochester, N. Y.

Coal Tar Chemicals

Subjecting impure phthalic anhydride to purifying treatment with a sulfuric anhydride purifying agent. No. 2,118,918. Harold B. Foster, Williamsville, and Elton B. Punnett, Buffalo, N. Y., to National Aniline & Chemical Co., N. Y. City.

Destructive distillation of distillable carbonaceous materials. No. 2,118,940. Mathias Pier, Heidelberg, Walter Kroenig, Ludwigshafen-am-Rhine, and Ernest Donath, Mannheim, Germany, to Standard-I. G. Co., Linden, N. J.

Production naphthalene derivatives containing $ACnH_{8}nN$ group. No. 2,119,077. Arthur J. Hill, New Haven, Conn., and Merritt C. Fernald, N. Y. City, to Ostro Research Labs., N. Y. City.

Recovery tar acids from tar; first separately mixing with the tar a constant proportion of an aqueous caustic soda solution and water. No. 2,119,132. Julius George Hatman, Elkins Park, Pa., to Sharples Specialty Co., Phila., Pa.

Apparatus for coking coal. No. 2,119,176. Wm. A. Ogg, Cincinnati, O.

Treatment bituminous coal for production of high molecular weight phenolic substances; heating coal with an aqueous solution of an alkali metal hydroxide. No. 2,119,213. Leo Kasehagen to Carnegie Institute of Technology, both of Pittsburgh, Pa.

Preparation aminotrifluoro-methyl-benzene-sulfonic acids; causing a molecular excess of chlorosulfonic acid to act upon aminotri-fluoro-methyl-benzenes at temperatures up to about 180°C. No. 2,119,882. Herbert Kracker and Fritz Herrlein, Frankfort-am-Main, Germany, to General Aniline Works, N. Y. City.

Production nitrosamines. No. 2,119,891. Wilhelm Seidenfaden and Hans Thomae, Offenbach-am-Main, Germany, to General Aniline Works, N. Y. City.

Treated fuel; coal coated with material applied as a water emulsion, containing polymers formed during clay treatment of cracked naphtha vapors, and a soap of naphthenic acid. No. 2,120,206. Roy F. Nelson, Port Arthur, Tex., to Texas Co., N. Y. City.

Process catalytically oxidizing naphthalene to form phthalic anhydride. No. 2,120,538. Chester E. Andrews, West Brookline, Upper Darby, Pa., to American Cyanamid & Chem. Corp., N. Y. City.

Production sulfonic acids of carboxylic acid amides. No. 2,120,557. Hans Haussmann, Mannheim, Germany, to I. G., Frankfort-am-Main, Germany.

Production Di-J acid by reacting J-acid with sodium bisulfite; conducting reaction in presence of a water-soluble, acid-reacting ammonium salt. No. 2,120,660. Walter Valentine Wirth, Woodstown, N. J., to du Pont, Wilmington, Del.

Production 2.4-dinitro-5-naphthylamino-phenols. No. 2,120,664. Edgar C. Britton, Frank B. Smith, John E. Livak, and Winfield W. Sunderland to Dow Chemical Co., all of Midland, Mich.

Coatings

Method surfacing an article; coating same with fluent mixture of a high melting point oxidized asphalt, an added, cut-back, volatile solvent, and finely divided inorganic filler, distributing granular material over coating. No. 2,118,526. Thos. Robinson, Smithtown, N. Y., to Lancaster Processes, Inc., N. Y. City.

Strip material for use in making center spot crowns; embodying a strip of non-absorbent, gas impervious, inert material having on one side a thin surface coating of a homogeneous mixture of latex and casein. No. 2,118,595. Jay Bernard Eisen, Yonkers, N. Y., to Ferdinand Gutmann & Co., Brooklyn, N. Y.

Tube coating machine. No. 2,118,599. John H. Friden, Maplewood, N. J., to Sun Tube Corp., Hillsdale, N. J.

Device for applying color to surfaces. No. 2,118,719. Sverre Frithjof Wraal to Ardecor (Products) Ltd., both of London, England.

Flowable paper coating made of chlorinated rubber, resin, paraffine wax, a plasticizer and a solvent; being combined in such way as to form a flexible, moisture-proof or moisture-resistant, transparent and non-tacky film upon evaporation of the solvent. No. 2,119,508. Philip S. Barnhart, Westfield, Mass., to Westfield River Paper Co., Russell, Mass.

Coated paper; glassine sheet coated with composition of chlorinated rubber, resin, paraffin wax, and plasticizer. No. 2,119,509. Philip S. Barnhart, Westfield, Mass., to Westfield River Paper Co., Russell, Mass.

Coated glassware; glass surface coated with metal, having outer protective coating of translucent tinted material applied thereto, giving color effects to light rays that pass through openings in metal coating. No. 2,119,608. Andrew H. Stewart, Shields, Pa., to Phoenix Glass Co., Monaca, Pa.

Metal coating for ceramic bodies. No. 2,119,989. Ray Higgins, Wadsworth, O.

Coating composition; a homogeneous dispersion of cellulose nitrate, a solvent mixture, a diluent, and a semi-plastic solid-gelled non-drying vegetable oil. No. 2,120,083. Edw. F. Arnold, Metuchen, N. J., and Michael J. Callahan, Wilmington, Del., to du Pont, Wilmington, Del.

Reducing solution for deposition of metallic films, which forms a tight, brilliant, durable metallic film on glass and is free from troublesome scum formation. No. 2,120,203. Delaware J. Hood and Jos. H. Winterburg, Phila., Pa., to Phoebe Phillips Prime, Paoli, Pa.

Method improving corrosion resistance of an adherent protective and bonding coating, consisting of at least one difficultly soluble phosphate on the surface of a metal. No. 2,120,212. Leo P. Curtin, Cranbury, N. J., to Curtin-Howe Corp., N. Y. City.

Electrode comprising stick having a body of carbon and a metallic conductive coating. No. 2,120,243. Jos. W. Droll, Chicago, Ill.

Method forming corrosion-proof lining in a concrete pipe; lining being mixture of vinyl resinoids, a highly volatile solvent, and an aggregate. No. 2,120,309. Francis L. Carson, San Francisco, Calif., to American Concrete & Steel Pipe Co., corp. of Calif.

Protection wood blocks while drying; coating ends and the exposed heart and bark faces with protective covering. No. 2,120,368. Herman E. McKenzie, Big Bay, Mich., to Brunswick-Balke-Collender Co., Chicago, Ill.

Method stamping and forming prefinished metal; applying protective paper to finished surface with an inner coating of latex to serve as adhesive, stamping and forming metal, then removing paper. No. 2,120,461. Lloyd G. Copeman to Copeman Labs., both of Flint, Mich.

Mold for sand having a plastic and adhesive coating consisting of an aqueous solution of bentonite, and a pulverulent facing. No. 2,120,526. Wm. Henry Owen, Chicago, Ill.

Coating canvas gloves or the like; using latex bath in process. No. 2,120,722. Neil E. Tillotson, Watertown, Mass.

Method hot-dipping metal coated objects. No. 2,120,737. Elgin Carleton Domm to National-Standard Co., both of Niles, Mich.

Metal coated object; comprising a base, a coating of zinc thereon, an intermediate flash coating of a high melt point metal, and a hot-dipped outer coating of cadmium. No. 2,120,738. Elgin Carleton Domm to National-Standard Co., both of Niles, Mich.

Dyes, Stains, etc.

Manufacture azo dyes. No. 2,118,661. Erich Baumann, Dessau-Ziebigk, Germany, to General Aniline Works, N. Y. City.

Dyeing apparatus. No. 2,118,807. Dick Carter, Austin Godwin Cuthbert-Smith, Harry Jackson, Leslie Paige Rendell, and Harry Augustus Thomas, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., corp. of Great Britain.

Production mordant color image; treating photographic sliver image with an aqueous solution containing a soluble zinc salt, a soluble ferricyanide, and a neutral salt of a strong base and a weak organic acid. No. 2,118,877. Rudolf von Arx, Berlin-Wilmersdort, Germany.

Dyeing apparatus. No. 2,118,951. Ernest A. Stienen, N. Y. City.

Production solid diazo salts. No. 2,118,986. Karl Schnitzpahn and Wilhelm Hoch, Offenbach-am-Main, Germany, to General Aniline Works, N. Y. City.

Production oil lubricating dyes possessing a green fluorescence; mixture of petroleum lubricating oil with a heavy condensate recovered from treatment of a normally gaseous hydrocarbon. No. 2,119,097. Ejnar W. Carlson, Roselle, N. J., to Standard Oil Development Co., corp. of Del.

Preparation condensation products of the diphenylamine series. No. 2,119,123. Werner Zerweck and Heinrich Ritter, both ot Frankfort-am-Main-Fechenheim, and Norbert Steiger, Frankfort-am-Main, Germany, to General Aniline Works, N. Y. City.

Device for applying dye and other liquids from containers. No. 2,119,646. Frank Pidel, Yonkers, N. Y.

Production pseudo-cyanine dyes. No. 2,120,322. Bernard Beilinson, Harrow Weald, England, to Eastman Kodak Co., Jersey City, N. J.

Production sulfo-acetontitrile dyestuffs. No. 2,120,401. Friedrich Felix and Wilhelm Huber, to Society of Chemical Industry in Basle, Basel, Switzerland.

Preparation o-hydroxyazo dyestuffs. No. 2,120,432. Paul Zervas, Cologne-Mulheim, and Paul v. Lendenfeld, Leverkusen-Wiesdorf, Germany, to General Aniline Works, N. Y. City.

Stain for coloring textiles; comprising an acid dye, a water-insoluble dye having affinity for cellulose acetate, and a dispersing agent. No. 2,120,552. Geo. Holland Ellis and Alex. James Wesson, Spondon, near Derby, England, to Celanese Corp. of America, corp. of Del.

Production azo dyestuffs. No. 2,120,560. Hans Krzikalla and Paul Garbsch, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, N. Y. City.

Production acid wool dyestuffs. No. 2,120,573. Heinrich Ritter, Frankfort-am-Main-Fechenheim, Germany, to General Aniline Works, N. Y. City.

Production water-insoluble azo dyestuffs. No. 2,120,728. Gerald Bonhote to Society of Chemical Industry in Basle, both of Basel, Switzerland.

Production derivatives of dyestuffs containing hydroxyl groups. No. 2,120,741. Chas. Graenacher and Heinrich Bruengger, Basel, and Franz Ackermann, Binningen, Switzerland, to Society of Chemical Industry in Basle, Basel, Switzerland.

Production derivatives of azo dyestuffs. No. 2,120,743. Chas. Graenacher and Heinrich Bruengger, to Society of Chemical Industry in Basle, all of Basel, Switzerland.

Production disazo dyestuffs. No. 2,120,754. Adolf Krebser, Riehen, near Basel, Switzerland, to J. R. Geigy A. G., Basel, Switzerland.

Explosives

Blasting initiator containing composition whose explosive ingredients consist of a homogeneous blend of black powder and ground smokeless powder. No. 2,118,533. Clifford A. Woodbury, Media, Pa., to du Pont, Wilmington, Del.

Liquid oxygen explosive comprising carbonaceous material in granular form impregnated with a solution of a fire-proofing material. No. 2,119,050. Geo. Burkle Holderer, Scarsdale, N. Y.

Spherical dropped shot suitable for use in a shot shell, consisting of an alloy of zinc and aluminum. No. 2,119,876. Michael George Corson, N. Y. City, to Remington Arms Co., corp. of Del.

Smokeless double base powder grain, including colloided nitrocellulose fines agglomerated through medium of a non-explosive binder, grain being hardened with an explosive. No. 2,120,324. Louis A. Dickerman, Hackettstown, N. J., to Hercules Powder Co., Wilmington, Del.

Non-gelatinous blasting explosive; comprising an explosive liquid nitric ester, nitrocellulose, ammonia nitrate, and a non-detonating absorbent. No. 2,120,503. Milo A. Nice, Hazleton, Pa., to Hercules Powder Co., Wilmington, Del.

Fine Chemicals

Manufacture water-soluble alkaline-earth metal salts and products obtained thereby. No. 2,118,985. Hans Schmidt, Wuppertal-Vohwinkel, and Heinrich Jung, Wuppertal-Hammerstein, Germany, to Winthrop Chemical Co., N. Y. City.

Production multicolor photographic pictures; material comprising a support, three differently sensitized light sensitive silver halide strata, each of latter being colored with a different dyestuff. No. 2,119,323. Bela Gaspar, Brussels, Belgium.

Production Δ_1-alkenyl cyanoacetic esters. No. 2,119,526. Arthur C. Cope, Bryn Mawr, Pa., Walter H. Hartung, Baltimore, Md., and Frank S. Crossley, Phila., Pa., to Sharp & Dohme, Inc., Phila., Pa.

Production salts of cinchona alkaloids. No. 2,119,527. Otto Dalmer and Fritz von Werder, Darmstadt, Germany, to Merck & Co., Rahway, N. J.

U. S. Chemical Patents

Off. Gaz.—Vol. 490, Nos. 4, 5—491, Nos. 1, 2, 3—p. 37

Preparation alkoxyalkyl mercury nitrogen compounds. No. 2,119,701. Jurgen Callsen, Wuppertal-Elberfeld, Germany, to Winthrop Chemical Co., N. Y. City.

Production sheet or film, using solution of a colloidal material in process. No. 2,119,702. Stewart J. Carroll, Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.

Reduction of contrast of photographic emulsions. No. 2,119,724. Cyril J. Staud, Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.

Preparation basically substituted enol and thienol ethers and esters. No. 2,119,802. Kurt Westphal and Heinrich Klos, Wuppertal-Elberfeld, Germany, to Winthrop Chemical Co., New York City.

Production synthetic U.S.P. menthol; hydrolyzing menthyl benzoate by reacting same with caustic soda in aqueous solution. No. 2,120,131. Morton Harris to Theo. Swann, both of Birmingham, Ala.

Manufacture chemical picture carriers, using brass covering, and aqueous solutions of mercury and silver nitrates in process. No. 2,120,416. Carl Renck and Hans Hermann Heinrich Renck, Hamburg, Germany.

Process for applying silver halide colloid layers without distortion on to future printing forms. No. 2,120,441. Ferdinand Leiber, Berlin-Friedrichshafen, Germany, to Naamlooze Vennootchap; Nederlandsch Laboratorium de Spaarnestad, Haarlem, Netherlands.

Glass and Ceramics

Glass insulator having permanently incorporated in its surface a coating which resists the adhesion of water. No. 2,118,795. Jesse T. Littleton to Corning Glass Works, both of Corning, N. Y.

Method and apparatus for making glass. No. 2,118,799. Paul G. Willets, West Hartford, Conn., to Hartford-Empire Co., Hartford, Conn.

Method and apparatus for making vitreous enamel articles. No. 2,119,259. Games Slayter, Newark, O., to Illinois Glass Co., corp. of O.

Manufacture laminated glass. No. 2,120,628. Ernest W. Reid, Brussels, Belgium, to Union Carbide & Carbon Corp., N. Y. City.

Industrial Chemicals, etc.

Catalytically oxidizing oxidizable organic materials; contacting same admixed with free-oxygen-containing gas, with a heated oxidation catalyst. No. 2,118,567. Nicholas A. Milas, Belmont, and Wm. L. Walsh, Somerville, Mass., to Research Corp., N. Y. City.

Production ethyl chloride; bringing gaseous mixture of hydrogen and vinyl chloride into contact with a hydrogenation catalyst. No. 2,118,662. Walter Baumann, Leuna, and Jos. Hirschbeck, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Recovery trimethylamine from mixture containing same and ammonia. No. 2,118,674. Paul Herold and Werner Wustrow, Leuna, Germany, to I. G., Frankfort-am-Main, Germany.

Manufacture nitrogen-containing derivatives of polymerized vinyl esters of halogen fatty acids. No. 2,118,713. Herbert Rein, Leipzig, Germany, to I. G., Frankfort-am-Main, Germany.

Manufacture quinone di-imides. Nos. 2,118,826-7. Waldo L. Semon, Silver Lake, O., to B. F. Goodrich Co., N. Y. City.

Preparation cobalt-copper catalysts. No. 2,118,829. Henry H. Storch, Pittsburgh, Pa., to Government of the U. S., as represented by the Secretary of the Interior.

Preparation secondary butanol from normal butene. No. 2,118,881. Alfred W. Francis, Woodbury, N. J., to Socony-Vacuum Oil Co., N. Y. City.

Preparation tertiary butanol from isobutene. No. 2,118,882. Alfred W. Francis, Woodbury, N. J., to Socony-Vacuum Oil Co., N. Y. City.

Manufacture fluorohydrocarbons; causing mixture of gaseous hydrofluoric acid and acetylene to circulate through a catalyst from the group of mercuric oxide and mercuric halides. No. 2,118,901. Julius Soll, Leverkusen-I.G. Werk, Germany, to I. G., Frankfort-am-Main, Germany.

Production nitrogen trichloride; electrolyzing an aqueous solution containing ammonium chloride and free hydrochloric acid. No. 2,118,903. Erich Staudt, Deventer, Netherlands.

Production a chloro-amine; electrolyzing an aqueous solution containing ammonium and chloride ions having a pH not lower than 7.45, maintaining such during electrolysis. No. 2,118,904. Erich Staudt and Gerrit van der Lee, Deventer, Netherlands.

Wood treating process; using hot creosote. No. 2,118,966. Jos. B. Card, Highland Park, Ill., to Illinois Dry Kiln Co.

Preparation sulfonic acids of aliphatic ethers of high molecular weight. No. 2,118,995. Edmund Waldmann, Klosterneuburg, and August Chwala, Vienna, Austria, to I. G., Frankfort-am-Main, Germany.

Manufacture alkyl halides; reacting a hydro-acid of the halogens, other than fluorine and iodine, and an olefine in presence of a contact mass. No. 2,119,079. Thos. Kane, Holborn, London, England, to Edw. Halford Strange, London, England.

Purification silica to render it fit for manufacture colorless glass; using sulfuric acid and another substance. No. 2,119,105. Robt. Hutchinson and John Arthur Newbold, Nottingham, England.

Process of rendering cellulose esters of organic acids stable; first by treatment with an aqueous solution containing an acid, then with a substance of alkaline reaction in presence of a liquid. No. 2,119,116. Aladar Schuller, Remi-Gustaaf Tritsmans, and Sergius Hendricx to Gevaert Photo-Producten, N. V., all of Anvers, Belgium.

Preparation a dithiazyl disulfide by preparing slurry of the corresponding 1-mercaptothiazole, adding a nitrite, then supplying an acid substance until reaction has been completed. No. 2,119,131. Albert J. Gracia, Cuyahoga Falls, O., to Wingfoot Corp., Wilmington, Del.

Treatment fish oils; hydrogenating oil to raise melting point, then treating with an isomerizing agent to further raise melting point without decreasing unsaturation of the partially hydrogenated oil. No. 2,119,141. Anderson W. Ralston and Stewart T. Bauer to Armour & Co., all of Chicago, Ill.

Production stabilized chlorinated paraffin wax; using an alkaline liquid in process. No. 2,119,149. Wm. T. Bishop to Hercules Powder Co., both of Wilmington, Del.

Manufacture alkyl halides; reacting a gaseous mixture of an olefine hydrocarbon and hydrogen chloride in presence of a catalytic substance which has previously been treated by leaching with a strong mineral acid. No. 2,119,167. Thos. Kane, Holborn, London, England, to Edward Halford Strange, Ventnor, Isle of Wight, England.

Preparation aralkyl ethers of cellulose; treating at reaction temperature alkali cellulose with an aralkyl halide in presence of an emulsifying agent soluble in the aralkyl halide. No. 2,119,171. Eugene J. Lorand to Hercules Powder Co., both of Wilmington, Del.

Separation trimethylamine from mixtures of monomethylamine and dimethylamine. No. 2,119,474. Le Roy U. Spence, Cheltenham, Pa., to Rohm & Haas, Phila., Pa.

Preparation cyclohexene chlorhydrin from mixtures of cyclohexene and cyclohexane; subjecting mixture in liquid form to action of hypochlorous acid. No. 2,119,485. Arthur A. Levine and Oliver W. Cass, Niagara Falls, N. Y., to du Pont, Wilmington, Del.

Method effecting addition of an alkali metal to a polycyclic aromatic hydrocarbon. No. 2,119,493. Norman D. Scott, Sanborn, N. Y., to du Pont, Wilmington, Del.

Separation hydroxy compounds of the cyclopentano polyhydro phenanthrene series. No. 2,119,515. Walter Schoeller, Berlin-Westend, Arthur Serini, Berlin, Max Gehrke, Birkenwerder, near Berlin, Hans Priewe, Rangsdorf (Teltow), Lothar Strassberger, Berlin-Wilmersdorf, and Willy Logemann, Berlin-Charlottenburg, Germany, to Schering-Kahlbaum A. G., Berlin, Germany.

Condensation products of acetylenic compounds; reacting a compound having an acetylenic linkage with an alpha halogenated ether in which the halogen is attached to an open chain carbon atom. No. 2,119,531. Harry B. Dykstra to du Pont, both of Wilmington, Del.

Manufacture alumina and potassium sulfate. No. 2,119,551. Florence B. MacCarthy to Olcott Payne, both of Phila., Pa.

Manufacture hydrogen from steam and a hydrocarbon. No. 2,119,565. Roger Williams to du Pont, both of Wilmington, Del.

Manufacture hydrogen; passing gaseous mixture of steam and a hydrocarbon over a heated catalytic body. No. 2,119,566. Roger Williams to du Pont, both of Wilmington, Del.

Process for drying substances in the condition of sludge and for evaporating solutions. No. 2,119,615. Helmut Wendelborn, Frankfort-on-the-Main, Germany, to American Lurgi Corp., N. Y. City.

Preparation glycols and their esters from fatty acids. No. 2,119,674. Adolf Grun, Basel, Switzerland, to American Hyalsol Corp., Wilmington, Del.

Production NH_3-air mixtures. No. 2,119,721. Ralph S. Richardson, Scarsdale, N. Y., to Chemical Construction Corp., N. Y. City.

Manufacture a powdered product from the mucilaginous substances of eel; using a hot solution of Japanese acid clay in process. No. 2,119,822. Toichiro Mayehara, Omori-ku, Tokyo, Japan.

Production aliphatic alcohols of high molecular weight. No. 2,119,899. Hermann Zorn, Ludwigshafen-am-Rhine, Friedrich Vogel, Mannheim, and Heinrich Wolter, Amsdorf, Germany, to I. G. Frankfort-am-Main, Germany.

Method preventing agglomeration of globular nitre cake; mixing therewith borate to inhibit coalescence of the individual particles. No. 2,119,970. Franklin D. Smith, Webster Groves, Mo., to Monsanto Chemical Co., St. Louis, Mo.

Production mixed alkyl-alkanonyl esters of dicarboxylic acids. No. 2,119,993. Lucas P. Kyrides, Webster Groves, Mo., to Monsanto Chemical Co., St. Louis, Mo.

Unit for treating atmosphere of a storage cabinet, comprising diatomaceous earth, holding ammonium sulfate, water, and gum tragacanth, cemented into a coherent mass by means of plaster of Paris. No. 2,120,020. Marion D. Coulter, Pittsburgh, Pa., to Toledo Scale Mfg. Co., corp. of N. J.

Manufacture unit for treating atmosphere of a storage cabinet; impregnating absorbent particles with a water solution and binding them together with a cement. No. 2,120,021. Marion D. Coulter, Pittsburgh, Pa., to Toledo Scale Mfg. Co., corp. of N. J.

Apparatus for converting dry ice into carbon dioxide gas. No. 2,120,057. Warren C. Merrill to Irving S. Baltimore, both of Los Angeles, Calif.

Preparation oil compositions. No. 2,120,089. Paul B. Cochran, Parlin, and Robt. T. Hucks, South River, N. J., to du Pont, Wilmington, Del.

Insulated electrical conductor; insulation consisting of a thin layer of rubber hydrochloride in intimate contact with an adjacent layer of asbestos. No. 2,120,095. John W. Greenleaf, Hamden, Conn., to Rockbestos Products Corp., corp. of Mass.

Manufacture hat; reducing fur to a colloidal state in presence of a caustic fluid, adding zinc oxide and another compound to form an agglomerating agent in situ. No. 2,120,105. Harry G. MacIntosh, Montclair, N. J.

Process extracting iodine from natural brine or the like. No. 2,120,218. Sheldon B. Heath and Frank A. Landee, to Dow Chemical Co., all of Midland, Mich.

Purification glycerol; removal odorous and odor-forming constituents therefrom; using activated vegetable carbon. No. 2,120,227. Gilbert W. Brant, Buffalo, N. Y., to du Pont, Wilmington, Del.

Process and apparatus for gas and liquid contact. No. 2,120,256. Carl E. Mensing, Somerville, N. J., to Calco Chemical Co., N. Y. City.

Production secondary butyl and other dixanthogens. No. 2,120,285. Merrill W. MacAfee, Berkeley, Calif.

Production sodium carbonate monohydrate. No. 2,120,287. Robt. Burns MacMullin, Niagara Falls, N. Y., to Mathieson Alkali Works, N. Y. City.

Thermal conversion distillable carbonaceous materials. No. 2,120,296. Mathias Pier, Heidelberg, and Eugen Anthes, and Hanns Schappert, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Continuous process for chlorination of aliphatic ketones. No. 2,120,392. Albert E. Calkins, Akron, O., to B. F. Goodrich Co., N. Y. City.

Apparatus for burning mineral sulfides in gaseous suspension-heat control. Nos. 2,120,474-5. Byron Angus Stimmel, Kenneth Duncan McBean, and Graham Cruickshank, Trail, B. C., Canada, to Consolidated Mining & Smelting Co. of Canada, Ltd., Montreal, Que., Can.

Flotation minerals from calcite, introducing into mineral containing same a collector having a fatty acid radical, a frothing agent, and a depressing agent; agitating and aerating, then removing concentrate. No. 2,120,485. Julius Bruce Clemmer and Robt. Gibson O'Meara, Rolla, Mo., one-fourth to Semmes & Semmes, Washington, D. C.

Apparatus for purifying or washing air or other gas, or for cooling a liquid. No. 2,120,490. Roy MacGregor Drummond, London, Eng.

Preparation an alkali-metal salt of sulfonated oxy-fatty acid-amides which are substituted at the amide group by a higher non-aromatic hydrocarbon radical, containing at least 6 carbon atoms, and at the oxygen by a hydrocarbon group containing not more than 10 carbon atoms. No. 2,120,512. Erich Rosenhauer, Dusseldorf, Benrath, Germany, to Henkel & Cie, G. m. b. H., Dusseldorf, Germany.

Determination of barium and sulfate by means of tetrahydroxyquinone. No. 2,120,529. Wilburn C. Schroeder, Highland Park, N. J., one-half to W. H. & L. D. Betz, Phila., Pa.

U. S. Chemical Patents
Off. Gaz.—Vol. 490, Nos. 4, 5—491, Nos. 1, 2, 3—p. 37

U. S. Chemical Patents

Off. Gaz.—Vol. 490, Nos. 4, 5—491, Nos. 1, 2, 3—p. 38

Method concentrating a non-sulfide material containing valuable and gangue particles. No. 2,120,535. Eltoft Wray Wilkinson, Berkeley, Calif., to Minerals Separation North American Corporation, N. Y. City.

Production naphthenyl alcohol, reducing a naphthenic acid in a hydrogen-atmosphere in presence of a hydrogenation catalyst. No. 2,120,537. Julius A. Wunsch, N. Y. City.

Manufacture carbon black in form of granules of sufficient density and cohesion to withstand handling in bulk with disintegration. Nos. 2,120,540-1. Edmund Billings, Weston, and Harold H. Offutt, Winchester, Mass., to Godfrey L. Cabot, Inc., Boston, Mass.

Preparation chloroether salts of dibasic acids. No. 2,120,544. Herman A. Bruson to Rohm & Haas Co., both of Phila., Pa.

Self coagulating and vulcanizable bath of latex containing a zinc salt of a volatile weak acid in ammoniacal aqueous solution mixed with aqueous solution of colloidal sulfur containing casein and formaldehyde. No. 2,120,572. Manlio Mosca Riatel, Turin, Italy, to Cela Holding S. A., Paris, France.

Manufacture titanium and other compounds. No. 2,120,602. Kenneth Hume Donaldson, Cleveland, O.

Proportioning apparatus. No. 2,120,608. David W. Haering, Chicago, Ill.

Preparation an oxygen-liberating composition from an alkali peroxide and a hydrated alkali peroxide. No. 2,120,643. Kurt A. Gerson, London, England.

Activated sludge process and apparatus. No. 2,120,658. James Donald Walker to American Well Works, both of Aurora, Ill.

Method freeing tetrachloroethylene from toxic impurities capable of reacting positively to the benzidine test and chlorinated saturated aliphatic hydrocarbons. No. 2,120,668. Alden W. Hansen to Dow Chemical Co., both of Midland, Mich.

Catalytic liquid phase oxidation of aromatic hydrocarbons. No. 2,120,672. Jos. R. Mares, St. Louis, Mo.

Method preparing a bromine substituted aliphatic hydrocarbon; reacting corresponding chlorinated aliphatic hydrocarbon with a solution of anhydrous aluminum bromide dissolved in an inert solvent. No. 2,120,675. Howard S. Nutting and Peter S. Petrie to Dow Chemical Co., all of Midland, Mich.

Manufacture substituted succinic acids and esters. No. 2,120,688. Edmund B. Towne to Monsanto Chemical Co., both of St. Louis, Mo.

Manufacture catalysts; first mixing a phosphoric acid with a siliceous material. No. 2,120,702. Vladimir Ipatieff and Raymond E. Schaad to Universal Oil Products Co., all of Chicago, Ill.

Regeneration of carbonized solid phosphoric acids. No. 2,120,712. Robt. Pryzel to Universal Oil Products Co., both of Chicago, Ill.

Preparation polymerization catalyst; forming pasty mixture of a phosphoric acid and a siliceous adsorbent. No. 2,120,723. Kenneth M. Watson to Universal Oil Products Co., both of Chicago, Ill.

Preparation butyl ester compositions. No. 2,120,755. Lucas P. Kyrides, Webster Groves, Mo., to Monsanto Chemical Co., St. Louis, Mo.

Production methyl ester compositions. No. 2,120,756. Lucas P. Kyrides, Webster Groves, Mo., to Monsanto Chemical Co., St. Louis, Mo.

Leather

Synthetic tanning agent; preparing same by condensation in an acid medium and neutralizing with a mixture of water-glass and alkali to an acidity suitable for tanning. No. 2,119,173. Paul Muller, Neu-Allschwil, near Basel, Switzerland, to J. R. Geigy A. G., Basel, Switzerland.

Metals, Alloys, Ores

Cut-out for electric circuits; an oxidized copper disc, said copper being alloyed with silver. No. 2,118,645. Edgar A. Harty, Marblehead, Mass., to General Electric Co., corp. of N. Y.

Steel welding rod containing silicon, manganese, another metal, and iron. No. 2,118,678. Arthur R. Lytle, Niagara Falls, N. Y., to Oxweld Acetylene Co., corp. of W. Va.

Steel welding rod producing sound, strong welds in high speed, continuous fusion deposition welding operations without manipulative puddling, containing silicon, sulfur and iron. No. 2,118,679. Arthur R. Lytle, Niagara Falls, N. Y., to Oxweld Acetylene Co., corp. of W. Va.

Hot-pierced, seamless tube made of a low carbon austenitic ferrous chromium-nickel-molybdenum alloy. No. 2,118,683. Harold D. Newell, Patterson Heights, Pa., and Martin Fleischmann, Canton, O., one-half to Babcock & Wilcox Tube Co., West Mayfield, Pa., and one-half to Timken Roller Bearing Co., Canton, O.

Aluminum alloy consisting of copper, zinc, iron, and aluminum, distinguished by great hardness and strength and possessing an elongation which is remarkable for a casting alloy. No. 2,118,686. Hans Steudel and Heinz Wiechell to Junkers Flugzeug-und-Motorenwerke Aktiengesellschaft, all of Dessau, Germany.

Yellow brass pipe alloy which resists or prevents dezincification and corrosion, containing copper, arsenic, and zinc. No. 2,118,688. Wm. R. Webster to Bridgeport Brass Co., both of Bridgeport, Conn.

Production stainless steel sheet or strip, free of surface defects. No. 2,118,693. Wm. B. Arness to Rustless Iron & Steel Corp., both of Balto., Md.

Manufacture heat-resistant sheet or strip of high tensile strength, good impact value and fine texture, comprising chromium, molybdenum, silicon, carbon, and iron cold rolled. No. 2,118,701. Alex. L. Feild, Balto. County, Md., to Rustless Iron & Steel Corp., Balto., Md.

Manufacture zinc-coated ferrous wire. No. 2,118,758. Frederick M. Crapo to Indiana Steel & Wire Co., both of Muncie, Ind.

Method chromium plating on a chromium surface; using first bath of an alkaline compound, finally immersing same in an acid solution, then electroplating in a chromic acid bath. No. 2,118,956. Arthur M. Wagner, Riverside, Ill., to Western Electric Co., N. Y. City.

Apparatus for distilling metal from material containing it. No. 2,118,973. Fritz Hansgirg, Radenthein, Austria, to American Magnesium Metals Corp., Pittsburgh, Pa.

Apparatus for separation of minerals. No. 2,119,185. Rupert Octavius Stokes and John Caldwell Allan, London, England.

Refining alloys of lead and tin. No. 2,119,197. Jesse O. Betterton and Yurii E. Lebedeff, Metuchen, N. J., to American Smelting & Refining Co., N. Y. City.

Recovery mercury from antimony-containing ores. No. 2,119,231. Reed W. Hyde, Summit, and Robt. H. Cromwell, East Orange, N. J., one-half to Dwight & Lloyd Sintering Co., N. Y. City, and one-half to Associated Metals & Minerals Corp., N. Y. City.

Precious metals alloying apparatus. No. 2,119,238. Richard C. Merrill, Cave Junction, Oregon.

Production material suitable for use as a base material in smelting of ferrous metals. No. 2,119,270. Ineo De Vecchis, Paris, France.

Continuous homogeneous ductile electrolytic deposit of gray nickel directly on steel, wherein deposit has a grain size between 1/1000 and 5/1000 of a millimeter. No. 2,119,304. Eugene D. Viers and Bernard C. Case to Eaton Detroit Metal Co., all of Cleveland, O.

Production hard metal alloy; preparing mixture including a tungsten carbide and mixing same with an aqueous medium containing a concentrated solution of a water soluble, organic acid salt compound. No. 2,119,487. Henry N. Padowicz, Bloomfield, N. J., to Sirian Wire and Contact Co., Newark, N. J.

Production hard metal alloys. No. 2,119,488. Henry N. Padowicz, Bloomfield, N. J., to Sirian Wire & Contact Co., Newark, N. J.

Manufacture hard metal alloy containing a refractory metal and carbon. No. 2,119,489. Wm. J. Beer, Union, N. J., to Sirian Wire & Contact Co., Newark, N. J.

Ingredient for incorporation in melt used for forming iron castings; mass of silicon carbide and cement set to a cohesive article from a wet slurry. No. 2,119,521. William A. Brown, Connellsville, Pa., to Carborundum Corp., Niagara Falls, N. Y.

Electrolytic process for extraction of metallic manganese. No. 2,119,560. Stephen M. Shelton, Reno, Nev., to Government of U. S., as represented by Secretary of the Interior.

Sucker rod composed of low carbon nickel-molybdenum steel. No. 2,119,698. Frank B. Bayless, Oil City, Pa., to Oil Well Supply Co., Dallas, Tex.

Manufacture heat treated, white cast iron alloy made from copper and manganese, containing also spheroidized cementite. No. 2,119,833. Wm. J. Sparling to Chain Belt Co., both of Milwaukee, Wis.

Production pure copper from copper-bearing scrap and metallurgical residues. No. 2,119,936. Clarence B. White, Phila., Pa.

Production alloy, resistive to mechanical wear and oxidation, particularly adapted for electrical purposes, consisting of cadmium and another metal. No. 2,119,965. Hans Heinrich Schwarzkopf, Reutte/Tirol, Austria, to N. V. Molybdenum Comp., Amsterdam, Netherlands.

Separation ores by froth flotation; subjecting pulp to flotation in presence of a reagent. No. 2,120,217. Benj. R. Harris, Chicago, Ill.

Method refining iron or steel. No. 2,120,298. Herman B. Schulz, Chicago, Ill.

Treatment surface of body of rimmed or open steel prior to application of a zinc coating; immersing same in molten bath of an alkaline carbonate, then subjecting to pickling operation. No. 2,120,494. Floyd M. Hauger, Chicago, Ill., to Keystone Steel & Wire Co., Peoria, Ill.

Manufacture zinc coated iron or steel wire from rimmed steel, drawing wire to desired gauge through a lubricant mixed with a metallic salt, finally passing same through bath of molten zinc. No. 2,120,496. Floyd M. Hauger, Chicago, Ill., to Keystone Steel & Wire Co., Peoria, Ill.

Alloy steel having in fully annealed state an impact strength at least 30 ft. lbs. Izod, containing chromium, carbon, nitrogen, another metal, and iron. No. 2,120,554. Russell Franks, Niagara Falls, N. Y., to Union Carbide & Carbon Corp., N. Y. City.

Production crude iron containing titanium in a coke blast furnace, using a charge mixture of bauxite containing titanium, limestone and coke and by use of a slag containing lime-aluminates. No. 2,120,740. Erich Faust and Eberhard Jung to Hochofenwerk Lubeck Aktiengesellschaft, all of Herrenwyk, Lubeck, Germany.

Naval Stores

Method for simultaneous refining and polymerization of rosin; treating same in solution with boron trifluoride. No. 2,120,015. Jos. N. Borglin to Hercules Powder Co., both of Wilmington, Del.

Paper and Pulp

Coated and light-permeable paper having coating on each side; coating being of the clay type and adapted to receive a printed impression. No. 2,119,164. Samuel S. Himmell, N. Y. City.

Method utilizing caustic alkali solution of a soda pulp mill in producing puffed pulp. No. 20,752. Reissue. Joseph E. Plumstead, Wilmington, Del., to Jessup & Moore Paper Co., Phila., Pa.

Apparatus for securing uniform drying of the sheet in paper making machines. No. 2,119,771. Arthur E. Broughton, Neenah, Wis.

Manufacture ligno-cellulosic fiber products, having high dry strength and high wet strength. No. 2,120,137. Wm. H. Mason to Masonite Corp., both of Laurel, Miss.

Petroleum Chemicals

Process cracking hydrocarbon oils. No. 2,118,605. Lyman C. Huff to Universal Oil Products Co., both of Chicago, Ill.

Method treating an earth or rock formation penetrated by a well bore: introducing into formation an aqueous electrolyte comprising a heavy metal ion, then electrolyzing the solution in situ. No. 2,118,669. John J. Grebe to Dow Chemical Co., both of Midland, Mich.

Process and apparatus for polymerizing oils. No. 2,118,728. James C. Harris, Jr., and Geo. Sutherland, Balto., Md.

Dewaxing hydrocarbon oils; diluting oil with ethyl sulfonyl chloride and an auxiliary solvent. No. 2,118,766. Josef Moos and Hans Ramser, New York City, to Edelneau Gesellschaft m.b.H., corp. of Germany.

Process for securing a high octane number motor fuel from a naphtha. No. 2,118,771. Ernest Terres, N. Y. City, and Erich Saegebarth, Long Island City, N. Y., and Jos. Moos, Berlin-Mariendorf, Germany, to Edelneau Gesellschaft m.b.H., Berlin, Germany.

Treatment of mixture of mineral oil hydrocarbons, contacting same with chromylchloride vapor. No. 2,118,772. Ernest Terres, N. Y. City, and Erich Saegebarth, Long Island City, N. Y., and Josef Moos, Berlin-Mariendorf, Germany, to Edelneau Gesellschaft m.b.H., Berlin, Germany.

Conversion of hydrocarbons. No. 2,118,822. Geo. W. Robinson, Houston, Tex., and Geo. Roberts, Jr., Montclair, N. J., to Polymerization Process Corp., Jersey City, N. J.

U. S. Chemical Patents

Off. Gaz.—Vol. 490, Nos. 4, 5—491, Nos. 1, 2, 3—p. 39

Manufacture wax acids. No. 2,118,915. Richard James Butz and Robt. Chas. Cantelo, Whiting, Ind., to Sinclair Refining Co., New York City.

Conversion hydrocarbon oils heavier than gasoline into more valuable products. No. 2,119,101. Gustav Egloff to Universal Oil Products Co., both of Chicago.

Motor fuel comprising gasoline containing dioxane as an improver. No. 2,119,110. John Warren McCaffrey to Universal Oil Products Co., both of Chicago, Ill.

Process for improving oxidation characteristics of a lubricating oil, by addition of an oxidation inhibitor and an open chain alcohol having at least 10 carbon atoms. No. 2,119,114. Roger W. Richardson and John J. Owen, Baton Rouge, La., to Standard Oil Development Co., corp. of Del.

Method preventing formation of a wax haze in acid treated lubricating oils derived from petroleum, using an acid sludge obtained in the acid treating of a lubricating oil derived from a paraffin base petroleum. No. 2,119,120. Jere C. Showalter, Goose Creek, Tex., to Standard Oil Development Co., corp. of Del.

Method inhibiting gum formation in stored hydrocarbon motor fuels. No. 2,119,240. Willard E. Lyons to Hendricks Research Corp., both of Chicago, Ill.

Process for cracking liquid hydrocarbon products boiling above 325°C., rich in polymerizable unsaturated hydrocarbons and containing more than 4% asphalt in presence of solid catalysts. No. 2,119,350. Mathias Pier, Heidelberg, and Ernst Donath, Mannheim, Germany, to I. G., Frankfort-am-Main, Germany.

Method cracking oils in vapor phase. No. 2,119,391. Percy C. Keith, Jr., Peapack, N. J., to Gasoline Products Co., Newark, N. J.

Treatment hydrocarbon oil. No. 2,119,401. Ralph H. Price, Galveston, Tex., and Vanderveer Voorhees, Hammond, Ind., to Standard Oil Co., Chicago, Ill.

Production stable hydrocarbon lubricants; subjecting petroleum distillate boiling in lubricating range to limited oxidation with ammonium nitrate, then reacting with an ammonium halide in highly dispersed state. No. 2,119,403. Ovid E. Roberts, Jr., New Rochelle, N. Y.

Treatment hydrocarbon oil. No. 2,119,409. Russell L. Zimmerman, Galveston, Tex., to Standard Oil Co. (Ind.), Chicago.

Oil gas generating process. No. 2,119,432. Walter B. Harris, Bayside, L. I. City, N. Y.

Method heating hydrocarbon oils. No. 2,119,470. Walter E. Lobo, Westfield, N. J., to Gasoline Products Co., Newark, N. J.

Preparation chlorinated hydrocarbons; reacting chlorine with propylene dichloride in presence of metallic iron as catalyst in the liquid phase. No. 2,119,484. Arthur A. Levine and Oliver W. Cass, Niagara Falls, N. Y., to du Pont, Wilmington, Del.

Lubricating composition made from a mineral lubricating oil and stabilized halogenated paraffin wax. No. 2,119,556. Carl F. Prutton, East Cleveland, O., to Lubri-Zol Develop. Corp., Cleveland, Ohio.

Production valuable hydrocarbons. No. 2,119,647. Mathias Pier, Heidelberg, and Walter Simon, Ludwigshafen-on-the-Rhine, Germany, to Standard-I. G. Co., Linden, N. J.

Production aqueous bituminous emulsions. No. 2,119,732. Lawton B. Beckwith, San Pedro, and Frederick S. Scott, Los Angeles, Calif., to Union Oil Co. of Calif., Los Angeles, Calif.

Dewaxing oils; separating asphalt and wax therefrom; using a gaseous hydrocarbon diluent in process. No. 2,119,733. Ulric B. Bray, Palos Verdes Estates, Calif., to Union Oil Co. of Calif., Los Angeles, Calif.

Continuous filtration of wax-bearing oils. No. 2,119,749. David R. Merrill, Long Beach, Calif., to Union Oil Co. of Calif., Los Angeles, Calif.

Process for resolving an asphalt-wax mixture obtained from an oil containing same. No. 2,119,759. Kenneth L. Wallin, San Pedro, Calif., to Union Oil Co. of Calif., Los Angeles, Calif.

Apparatus and method for treating hydrocarbon oils. No. 2,119,918. Lester Kirschbraun to Universal Oil Products Co., both of Chicago, Ill.

Method and composition for preventing loss of drilling fluid in well drilling operations. No. 2,119,829. Claude P. Parsons, Duncan, Okla., to Phillips Petroleum Co., Bartlesville, Okla.

Separation asphalt-free hydrocarbon oil into its lighter and heavier normally liquid hydrocarbon components. No. 2,119,871. James M. Whitely, Roselle, N. J., to Standard Oil Development Co., corp. of Del.

Production halogenated hydrocarbons of improved solvent power. No. 2,119,873. Peter J. Wiezevich (now by judicial change of name, Peter J. Gaylor), Elizabeth, and Hans G. Vesterdal, Linden, N. J., to Standard Oil Development Co., corp. of Del.

Separating wax from wax-oil mixtures; mixing latter with wax separation aid, selected from class of oxidized wool grease and oxidized lanolin, and a diluent. No. 2,119,938. Chas. Douglas Barnes, Long Beach, and Marcellus T. Flaxman, Wilmington, Calif., to Union Oil Co. of Calif., Los Angeles, Calif.

Production oxidized wax from a wax which has been separated from an S. A. E. 50 waxy lubricating oil distillate. No. 2,119,940. Donald E. Carr, Long Beach, and Maner L. Wade, Naples, Calif., to Union Oil Co. of Calif., Los Angeles, Calif.

Lubricant made from a hydrocarbon oil, an addition product of acidic nature, and having an organic base. No. 2,120,119. Waldo L. Steiner to Continental Oil Co., both of Ponca City, Okla.

Treatment cracked distillates. No. 2,120,134. Wayne E. Kuhn, Port Arthur, Tex., to Texas Co., N. Y. City.

Method treating residual paraffinic oils for manufacture cylinder stocks by treating oil with sulfuric acid. No. 2,120,135. Carl E. Lauer and Laurance V. Phillips, Port Arthur, Texas, to Texas Co., N. Y. City.

Solvent extraction of oil. No. 2,120,209. Ulric B. Bray, Palos Verdes Estates, Calif., to Union Oil Co. of Calif., Los Angeles, Calif.

Stabilization cracked gasoline against deterioration; adding to same an alkyl-substituted para-aminophenol and an alkyl-substituted paraphenylenediamine dissolved in an alcoholic solvent. No. 2,120,224. Chas. G. Dryer to Universal Oil Products Co., both of Chicago, Ill.

Destructive hydrogenation of carbonaceous materials. No. 2,120,295. Mathias Pier, Heidelberg, and Ernst Donath, Mannheim, Germany, to Standard-I. G. Co., Linden, N. J.

Whirl atomizer for hydrocarbons. No. 2,120,388. Adolf Bargeboer, The Hague, Netherlands.

Conversion hydrocarbon oils. No. 2,120,655. LeRoy G. Story, Mt. Vernon, N. Y., to Texas Co., N. Y. City.

Conversion of hydrocarbons. No. 2,120,715. Jean Delattre Seguy to Universal Oil Products Co., both of Chicago, Ill.

Pigments, Dry Colors and Fillers

Preparation titanium-covering pigments; hydrolyzing an aqueous solution containing a titanium salt. No. 2,118,916. Julius Drucker, Leverkusen-I. G. Werk, Germany, to I. G., Frankfort-am-Main, Germany.

Production pigment powder insoluble in all common solvents; incorporating coloring matter in a solution of a condensation product of formaldehyde with another substance of the urea group. No. 2,119,189. Gustave Widmer, Phila., Pa., to Society of Chemical Industry in Basle, Basel, Switzerland.

Resins, Plastics, etc.

Production laminated product; applying to foundation-body a surface-sheet coated on outer and inner sides with dried pigmented resin varnishes of different types. No. 2,118,549. John D. Cochrane, Jr., to Formica Insulation Co., both of Cincinnati.

Production heteropolymerican reaction products of sulfur dioxide and olefine; reaction being carried out in presence of a catalyst; impregnating an inert fibrous filler material with said catalyst and incorporating filler in reaction mixture. No. 2,118,813. Frederick E. Frey and Paul A. Bury, Bartlesville, Okla., to Phillips Petroleum Co., corp. of Del.

Composition for insulating wire; consisting of cellulose ester and furfural residue resin heated together to a thermoplastic state. No. 2,118,-838. Edw. H. Converse, Poughkeepsie, N. Y., to James K. Delano, Rye, N. Y.

Mixed polymerization product of a vinyl ester of an aliphatic carboxylic acid containing from 5 to 6 carbon atoms and styrene. No. 2,118,863. Walter Reppe, Ludwigshafen-am-Rhine, Werner Starck, Hofheim (Taunus), and Arthur Voss, Frankfort-am-Main-Hochst, Germany, to I. G., Frankfort-am-Main, Germany.

Production polymerization products from vinyl esters. No. 2,118,864. Walter Reppe, Ludwigshafen-am-Rhine, Werner Starck, Hofheim (Taunus), and Arthur Voss, Frankfort-am-Main-Hochst, Germany, to I. G., Frankfort-am-Main, Germany.

New resinous composition, reaction product of maleic anyhdride and dipentene. No. 2,118,925. Irvin W. Humphrey to Hercules Powder Co., both of Wilmington, Del.

Synthetic resin; reaction product of a polyhydric alcohol, dipentine-maleic anhydride, and an organic carboxylic acid. No. 2,118,926. Irvin W. Humphrey to Hercules Powder Co., both of Wilmington, Del.

Production mixed polymerization products. Nos. 2,118,945-6. Walter Reppe, Ludwigshafen-am-Rhine, Werner Starck, Hofheim (Taunus), and Arthur Voss, Frankfort-am-Main, Germany, to I. G., Frankfort-am-Main, Germany.

Hydrogenation of phenol-ketone condensation products. No. 2,118,954. Raymond E. Thomas, Newburgh, N. Y., to du Pont, Wilmington, Del.

Laminated trimming strip, made by cementing together two sheets of crepe paper by means of an inelastic, inert adhesive, applying to surface of resulting laminated web a liquid coating and allowing to dry. No. 2,119,482. Glen H. Huffer to Backstay Welt Co., both of Union City, Ind.

Resin composition; polymer of a dihydrogenated aromatic polycyclic aromatic hydrocarbon and a resinous rubber derivative. No. 2,119,507. Percy Morgan Clark, Parlin, N. J., to du Pont, Wilmington, Del.

Preparation caoutchouc-like products; subjecting to polymerization compound produced by addition of hydrochloric acid on vinyl-butadienyl-acetylene. No. 2,119,629. Ludwig van Zutphen, Frankfort-on-the-Main-Hochst, Germany, to I. G., Frankfort-on-the-Main, Germany.

Transparent, flexible sheet made from cellulose acetate-propionate and using a lower alkyl ricinoleate as plasticizer. No. 2,119,722. Henry B. Smith, Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.

Manufacture resin films. No. 2,119,727. Ralph H. Talbot, Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.

Manufacture hydrocarbon resins by polymerization of a cracked hydrocarbon distillate by means of a Friedel-Crafts polymerizing agent. No. 2,119,957. Thos F. Nealon, Boston, Mass., to Monsanto Chemical Co., St. Louis, Mo.

Manufacture hydrocarbon resinous polymers. No. 2,119,976. Ivan V. Wilson, Dayton, O., to Monsanto Chemical Co., St. Louis, Mo.

Process molding methacrylic acid esters. No. 2,120,006. Daniel E. Strain to du Pont, both of Wilmington, Del.

Intermediate article to be dissolved for liquid use in varnish or the like; an ester gum in form of short sticks. No. 2,120,076. Chas. Martin Ross, Mansfield, Mass., to John D. Lewis, Inc., corp. of R. I.

Preparation oil composition convertible by heating to a rubber-like gel, using a resin in process. No. 2,120,124. Wm. H. Butler, Palisades Park, N. J., to Bakelite Corp., N. Y. City.

Preparation non-inflammable plastic compositions; incorporating chlorinated rubber with an excess of chlorinated paraffin wax at an elevated temperature, then incorporating a further quantity. No. 2,120,222 Wilfred Devonshire Spencer, Liverpool, and Frederic Thos. Walker, London, England, to Imperial Chemical Industries, Ltd., London, England.

Production artificial resins. No. 2,120,343. Isidore George Wolf, Dordrecht, Netherlands.

Method changing aqueous solutions and suspensions of thermoplastic substances into particle form. No. 2,120,549. Theo. Williams Dike to I. F. Laucks, Inc., both of Seattle, Wash.

Production plastic product moldable under combined action of heat and pressure without presence of a filler; made from a phenolic resin. No. 2,120,585. Johnstone E. Weelands, Verona, N. J., to Bakelite Corp., N. Y. City.

Rubber

Recovery rubber from rubber-bearing plant which does not respond to tapping; disintegrating plant in presence of a medium maintained at the same hydrogen ion concentration as the fresh juice of the plant in fresh condition. No. 2,119,030. David Spence, Carmel, Calif.

Preparation artificial rubber dispersion for use in dipping operations. No. 2,119,600. Francis Norman Pickett, Westminster, London, England, to United States Rubber Prods., Inc., N. Y. City.

Concentration rubber latex. No. 2,119,620. Ernst Benzing and Johannes Jaenicke, Frankfort-on-the-Main, Germany, to Revertex Ltd., London, England.

Manufacture rubber dust from latex. No. 2,119,932. Martinus Joannes Stam, The Hague, Netherlands.

Method treating rubber. No. 2,120,547. Albert M. Clifford, Stow, O., to Wingfoot Corp., Wilmington, Del.

U. S. Chemical Patents
Off. Gaz.—Vol. 490, Nos. 4, 5—491, Nos. 1, 2, 3—p. 39

U. S. Chemical Patents

Off. Gaz.—Vol. 490, Nos. 4, 5—491, Nos. 1, 2, 3—p. 40

Manufacture vulcanizable latex bath; dissolving in ammonia a zinc salt of a weak acid, mixing with a protective colloid, then with a solution of a weakly dissociated sulfur compound, and incorporating product thus formed into a latex bath. No. 2,120,579. Fernand Frederic Schwartz, Paris, France, to Cela Holding S. A., Luxemburg, Luxemburg.

Textile, Rayon

Rendering textiles crease-resistant, by first impregnating same with aqueous solution of a compound supplying formaldehyde in presence of a nonoxidizing acid-reacting compound. No. 2,118,685. Josef Stadler, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany

Process for improving handle of textiles comprising celullose derivative yarns which have been subjected to a crepe twisting operation in presence of steam or hot water, by treatment with a swelling agent for the cellulose derivative. No. 2,118,839. Henry Dreyfus, London, England.

Production highly twisted crepe thread of cellulose acetate filaments; subjecting same to action of a shrinking agent. No. 2,118,840. Henry Dreyfus, London, England.

Apparatus for manufacture or treatment of artificial filaments, yarns, etc. No. 2,118,856. Robt. Wighton Moncrieff and Frank Brentnall Hill, Spondon, near Derby, England, to Celanese Corp. of America, corp. of Del.

Manufacture elastic filaments; first precipitating cellulose hydrate in jelly form from crude viscose solution. No. 2,118,897. Robert and John Pickles, Burnley, England.

Production improved effects on cellulose fabrics; causing fabric to contain formaldehyde and an acid reacting catalyst, then mechanically treating by compression to alter surface conformation of material. No. 2,119,150. Harold Henry Bowen, Heaton, Bradford, and Victor Hoffmann Majerus, Vilvoorden, Wyke, Bradford, England, to Bradford Dyers' Ass'n, Ltd., Bradford, England.

Method rapidly drying synthetic material such as artificial silk, rayon or regenerated cellulose in web or yarn form. No. 2,119,261. Bernard B. Andrews, Braintree, Mass.

Production fabric composed of composite yarn comprising cut rayon staple and vegetable staple, characterized by high resistance to creasing or wrinkling. No. 2,119,468. Chas. P. Coulter, Jr., Great Neck, N. Y., to Nufibre Corp., N. Y. City.

Production crinkle effects on yarns and other textiles. No. 2,120,551. Henry Dreyfus, London, England.

Production high lustre on dyed fibers; by treating latter with alkaline liquids. No. 2,120,757. Gustav Landauer, Mannheim, Germany.

Water, Sewage Treatment

Means for protecting walls of boilers and similar apparatus against scale, incrustations and corrosions. No. 2,118,979. Plinio Sergio Davide Mazza, Paris, France.

Method inhibiting in calcium-containing waters the precipitation of calcium carbonate resulting from an increase in carbonate ion concentration; adding to water a water-soluble, molecularly dehydrated phosphate. No. 20,754. Reissue. Ludwig Rosenstein, San Francisco, Calif., to Hagan Corp., Pittsburgh, Pa.

Water softening apparatus. No. 2,120,429. John H. Nash, Dayton, O.

Apparatus and process for desilting natural streams of water. No. 2,120,516. Fred. Victor Wm. Swanton, one-half to Charles Perlman, both of Johannesburg, Transvaal, South Africa.

Sewage treatment for raw sewage containing constituents capable of reacting with $Fe(OH)_3$. No. 2,120,634. Ralph A. Stevenson, Palo Alto, Calif., to Great Western Electro-Chemical Co., San Francisco, Calif.